SWIB Board Workshop Materials for October 15-16, 2024

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Adjourn	

STATE OF WISCONSIN INVESTMENT BOARD

Name of Meeting: **Regular Meeting of the Board of Trustees**

Date/Time Tuesday, October 15, 2024 1:00 pm
Room: Wisconsin Room
Address: Lake Lawn Resort
2400 East Geneva Street
Delavan, WI 53115

OPEN SESSION
Workshop Welcome & Kickoff
Public Policy: US Election and Market Perspective
Enhancing Capital Efficiency: Dockside
2025 Asset Allocation Preview: Long-Term Private Market Allocation
CIO Perspective

Motion to Recess

Name of Meeting: **Regular Meeting of the Board of Trustees**

Date/Time: Wednesday, October 16, 2024 9:00 am
Room: Wisconsin Room
Address: Lake Lawn Resort
2400 East Geneva Street
Delavan, WI 53115

OPEN SESSION
Workshop Welcome
CLOSED SESSION*
RECONVENE IN OPEN SESSION
Announcement of Matters Taken Up in Closed Session

Motion to Adjourn

* The motion to go into closed session at this meeting is made pursuant to: (i) Section 19.85(1)(d) of the Wisconsin Statutes to consider strategies for crime detection and prevention with respect to SWIB's information technology systems and/or for any comments or discussion on prior closed session minutes that discuss the same; (ii) Sections 19.36(5) and 19.85(1)(e) of the Wisconsin Statutes to consider confidential and proprietary strategies for the investment of public funds relating to specific proprietary investment strategies and/or for any comments or discussion on prior closed session minutes that discuss the same; and (iii) Section 19.85(1)(c) of the Wisconsin Statutes to discuss performance evaluation data of specific SWIB employees, including SWIB's executive director/chief investment officer and SWIB's board of trustees, and/or for any comments or discussion on prior closed session minutes that discuss the same. The Board may convene in additional closed sessions or announce additional closed session items at the meeting in accordance with the procedure outlined in the Attorney General's Opinion reported at 66 OAG 106 (1977). Whenever a closed session is held, the Board will subsequently reconvene in open session to cover remaining agenda items.

View from Washington

Francis J. Kelly

Founder & Managing Partner
Fulcrum Macro Advisors LLC and
Senior Political Strategist for DWS

Geopolitics, Geoeconomics, Demographics, & Elections 2024 – 2025: Everything, Everywhere Keeps Changing All At Once

Frank Kelly
Founder & Managing Partner
Fulcrum Macro Advisors

Let’s Take a Quick Tour Around the World: There Are No Dull Days Anymore





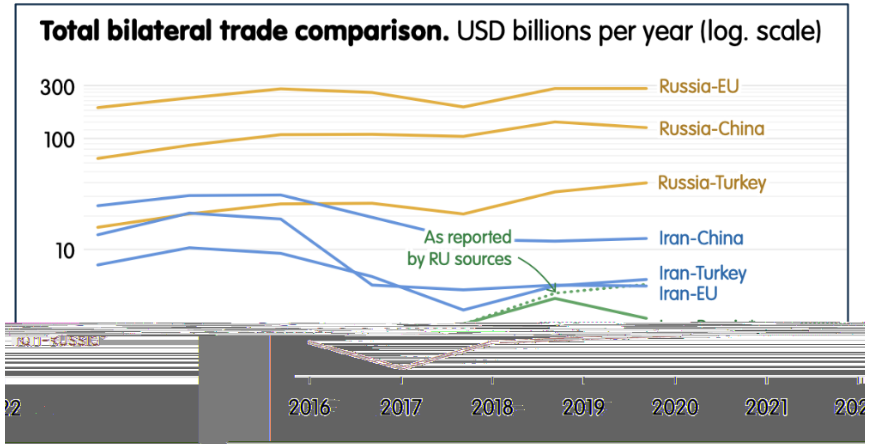

The World Has Essentially Changed Overnight: Countries and Markets Struggle with the New Global Fundamentals

- **The Re-Wiring of Globalization -** Trade tensions between China and the US/EU/Indo Pacific has triggered a strong embrace of Industrial Policy among major free market nations for the sake of "national economic security" (e.g., CHIPS Act in the US and EU, competition for critical mineral assets, etc.).

- **Demographics are changing everything -** India is now the largest population in the world as China begins to rapidly shrink. Africa is the fastest growing region of the world. Japan and many EU nations are seeing significant long-term shrinkage of their populations but are seeking to make up for it with immigration – as is the US.

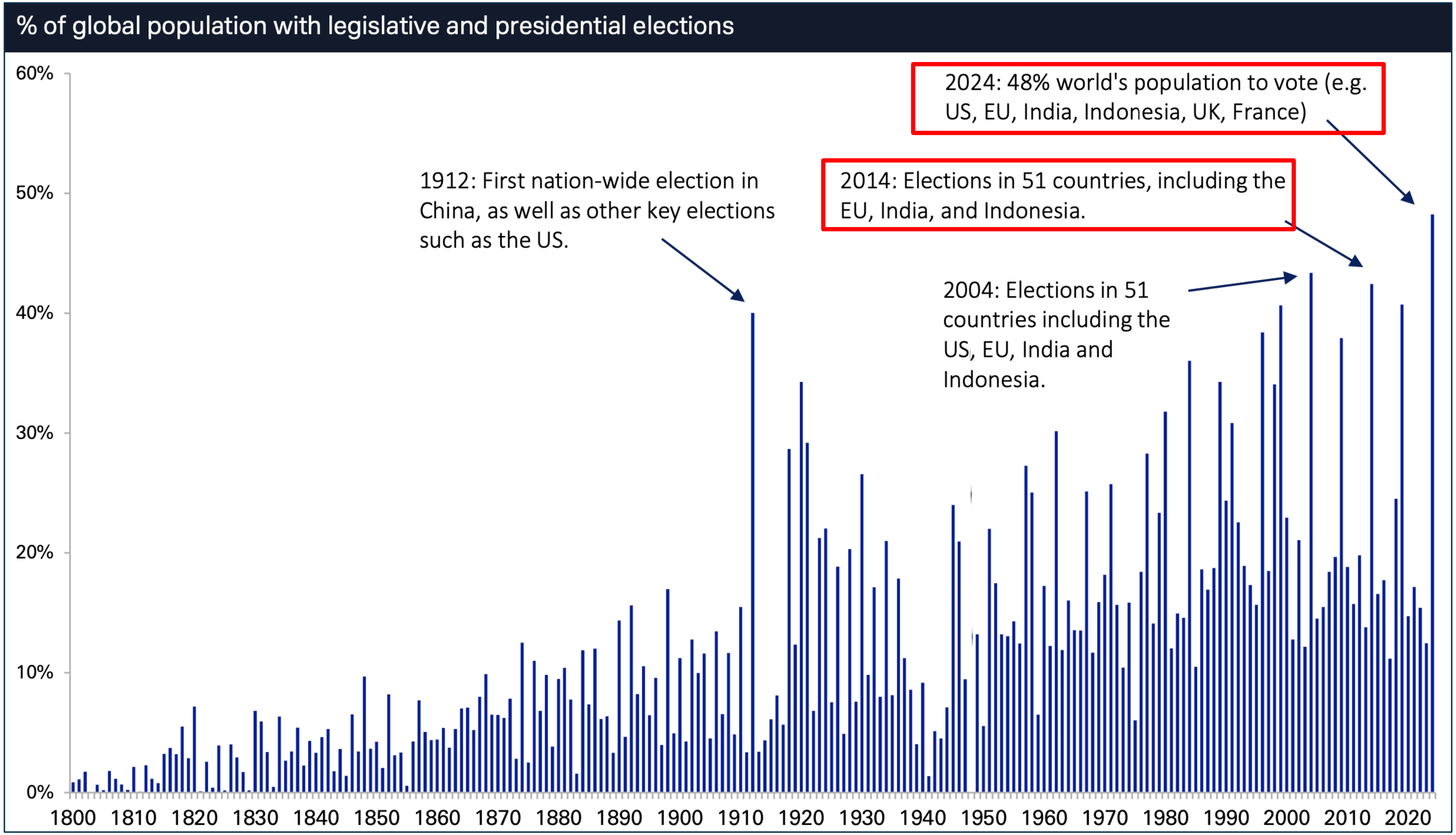
- **The New Multipolar World: The New Axis of Evil Has Arrived –** Russia's invasion of Ukraine was the tipping point. Now Iran, North Korea, Venezuela, Cuba, and to some degree China are aligned in supporting each other militarily and economically.

- **Commodities Are A Driving Force in Geopolitical Shifts –** We are in something of a new age where the global and regional battle for access to commodities – especially critical minerals, agricultural, water, etc. – are driving what we could consider new Cold Wars - as well as real wars. And financial markets are major players in in this Cold War.



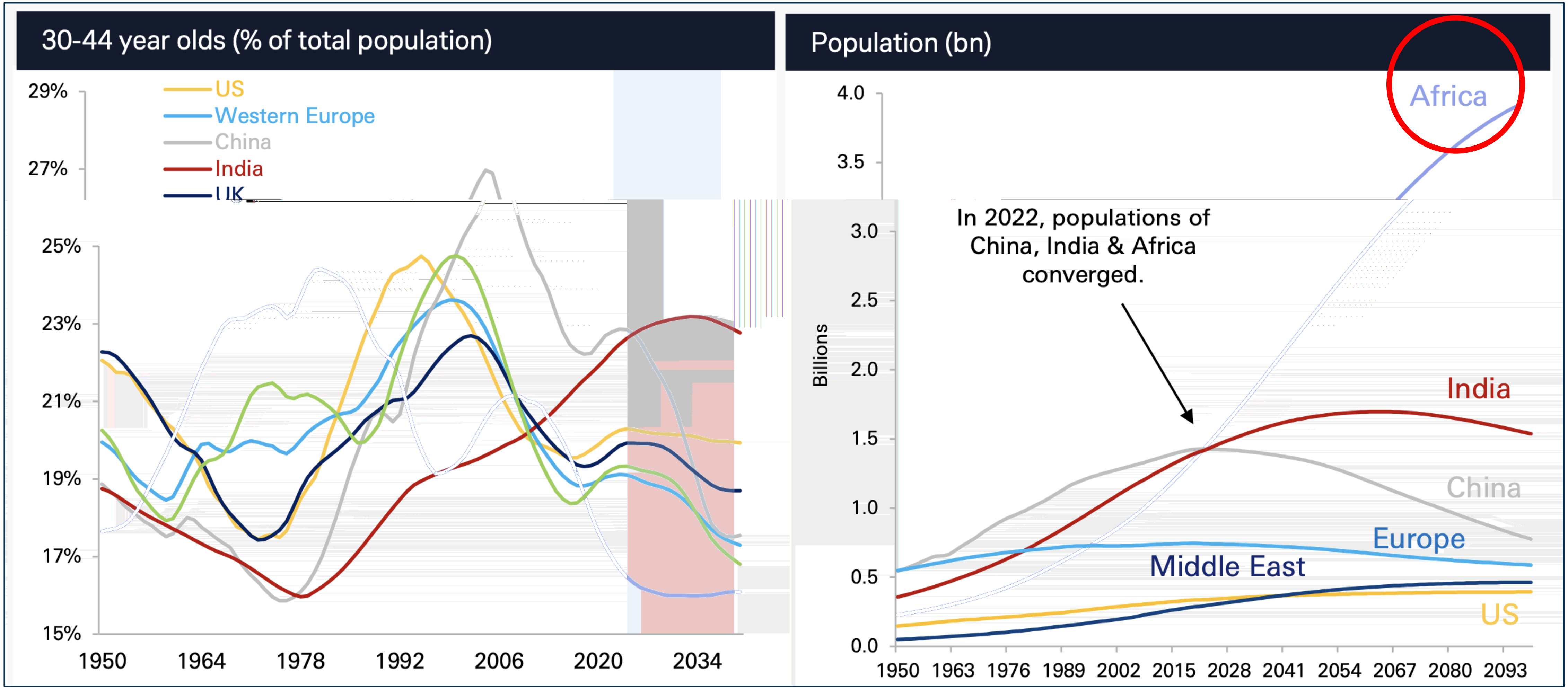
Source: IMF, European Council on Foreign Relations

Election Year: 48 percent of World Population is Voting in 78+ Elections in 2024



Source: The Economist, Deutsche Bank Research

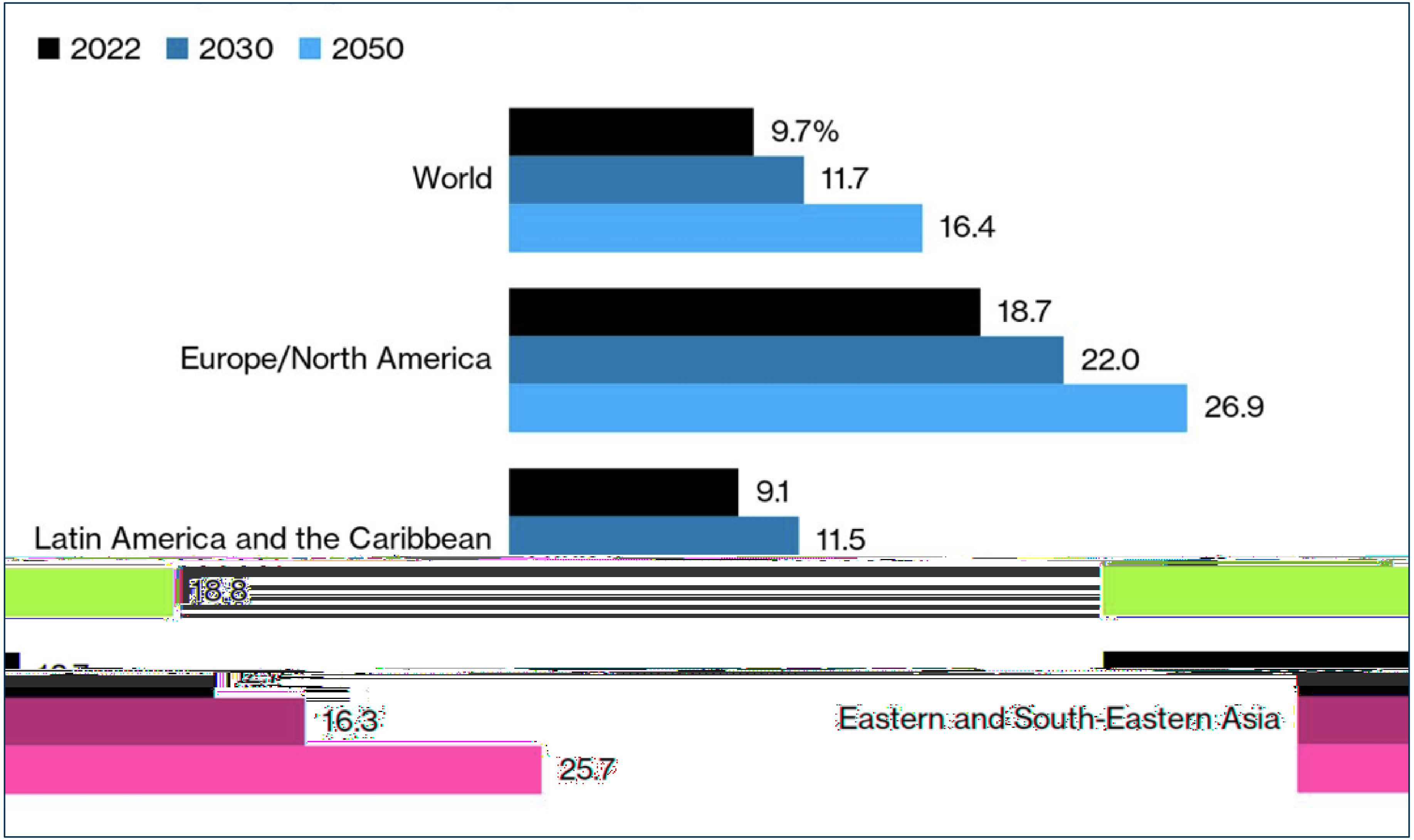
The Global Demographic Roller Coaster: Africa is Booming, India is Growing, the US is Steady, China is in Free Fall



Source: Deutsche Bank, World Bank

But Overall, the World is Getting Older - Quickly

The Percentage of the Population Aged 65 Years or Over



Source: Bloomberg, World Bank, United Nations

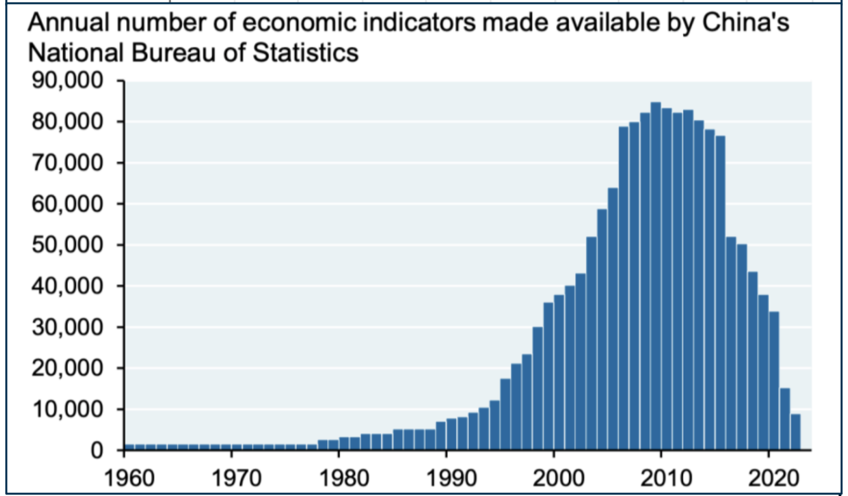
China: No Longer Destined to Dominate and Struggling With Major Economic and Social Risks as Decoupling From West Grows

- The 20th Chinese Communist Party Congress in 2022 granted President Xi Jinping an unprecedented third term. In his acceptance speech, Xi's focus was "Security." He said the word **96 times**.– But he was talking as much about internal security as external security.

- The Taiwan Invasion Risk: Worrisome but not likely in the next three-to-five years. US assessment: An invasion would be Xi's ***"last, worst choice."***

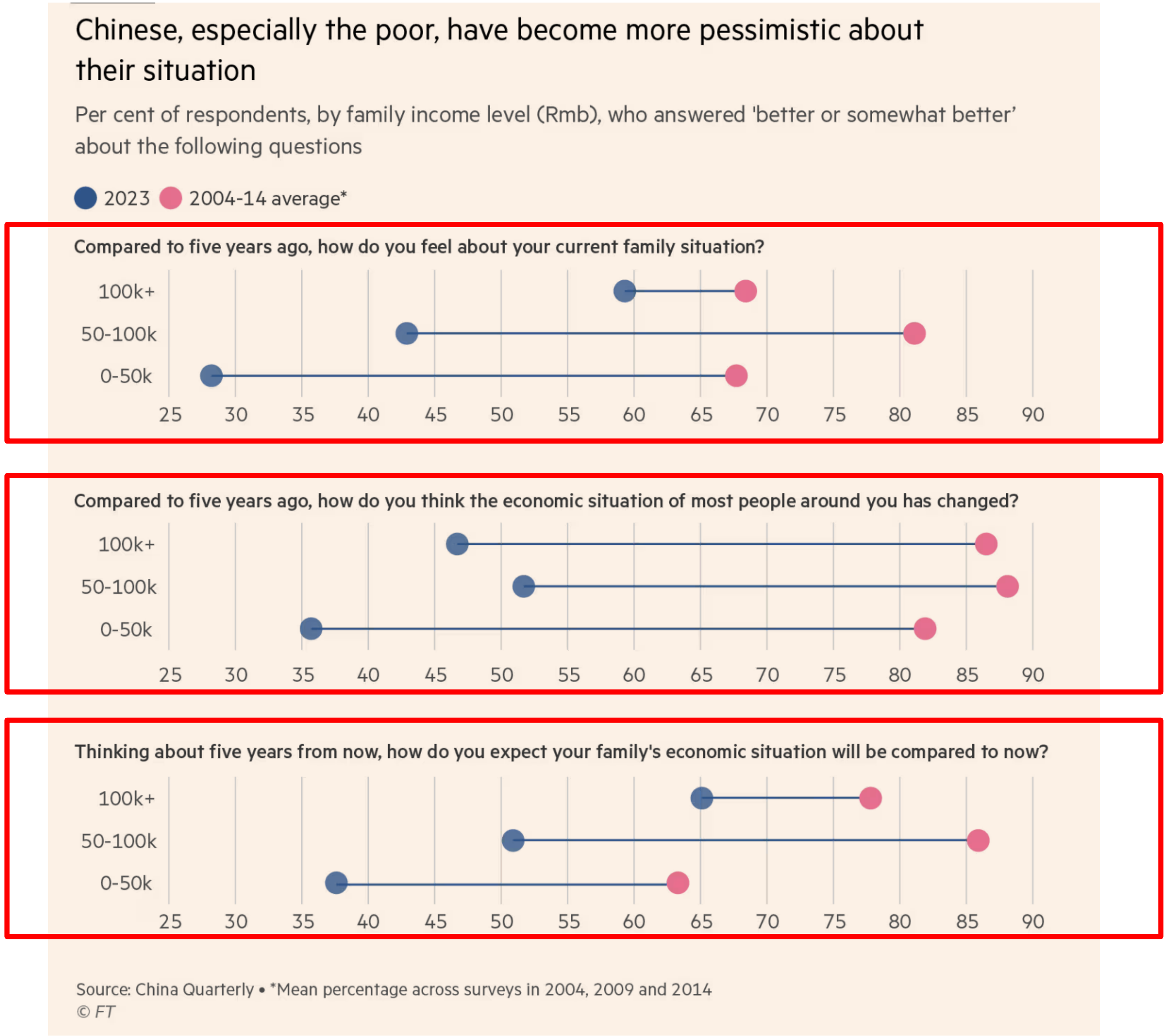
- A major casualty of Xi's policies is the impact on the regional and global markets investing in China: Foreign Direct Investment has nosedived. And there is less transparency overall, especially of key economic data. This has been the trend under Xi for the last 12 years and is continuing. Add to that Chinese exports to the West are decreasing.

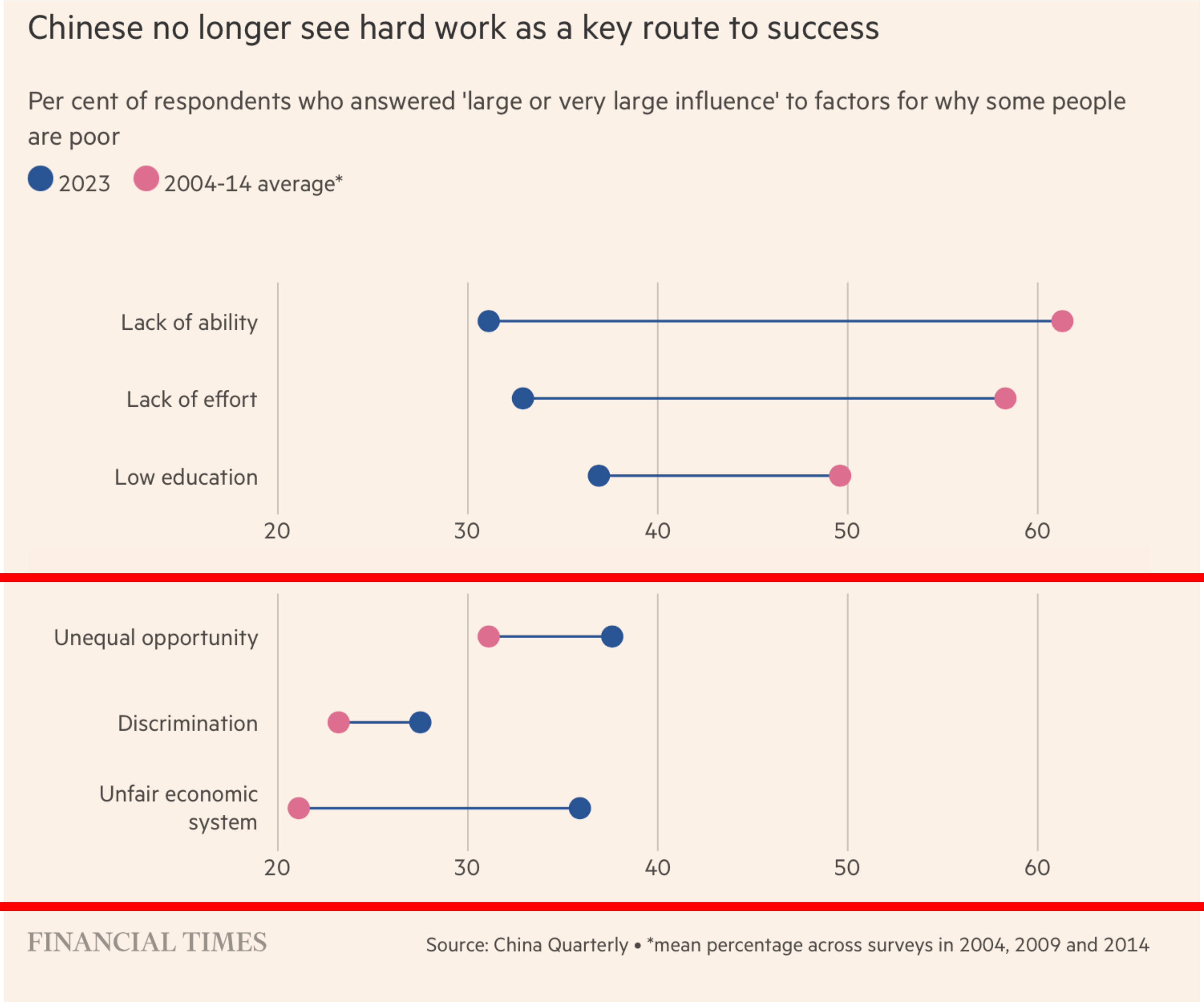
- **Watch the youth unemployment rate: Officially, it is at 21.3 percent. The real number is likely close to 30 percent and may be trending toward 40 percent.** But we will never know because Beijing just suspended all reporting of that data.



Sources: Bloomberg, Financial Times

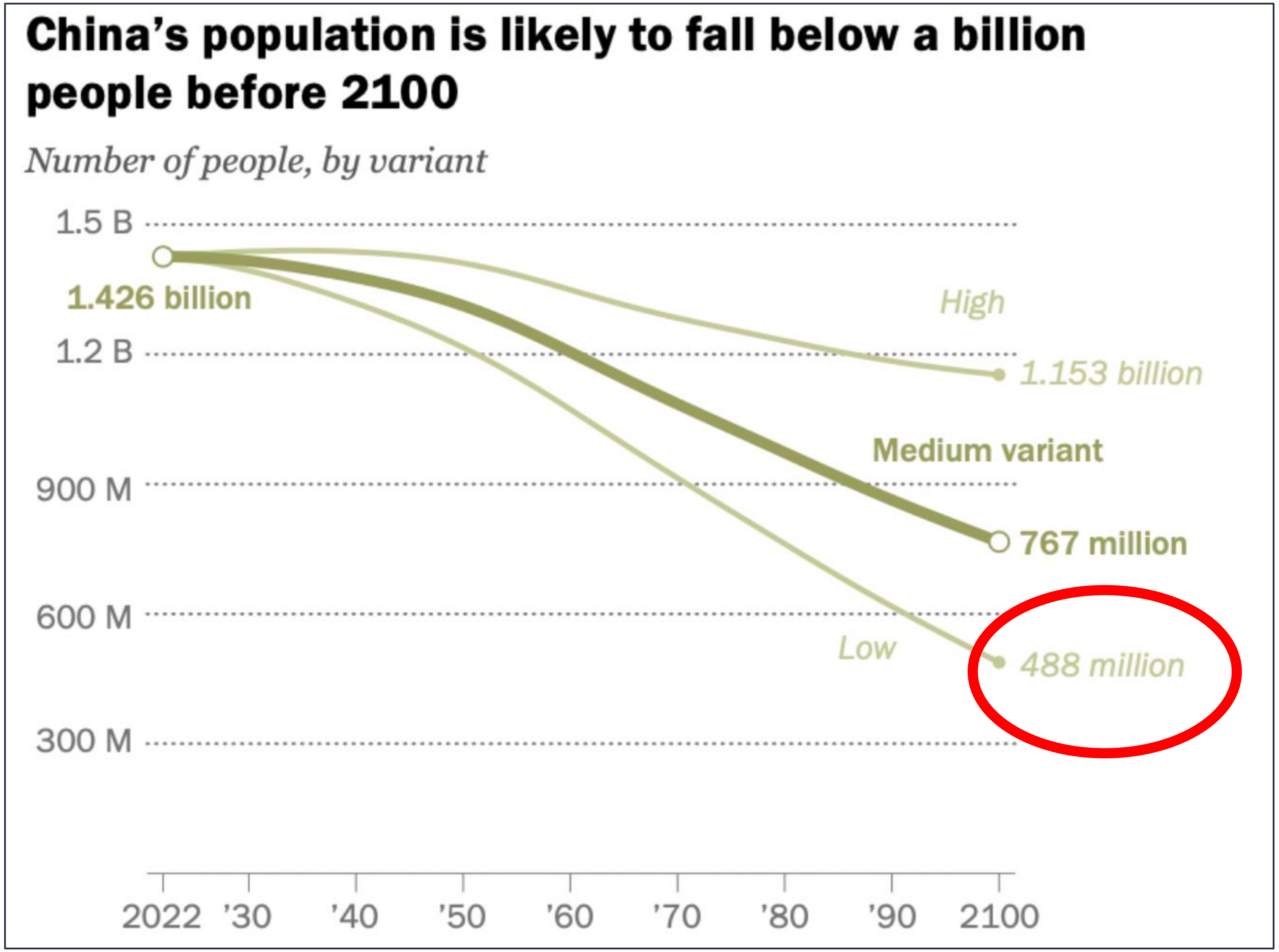
Social Discontent is Growing in China





Chinese no longer see hard work as a key route to success
Per cent of respondents who answered 'large or very large influence' to factors for why some people are poor
2023
2004-14 average*
Lack of ability
Lack of effort
Low education
20
30
40
50
60
Unequal opportunity
Discrimination
Unfair economic system
20
30
40
50
60
FINANCIAL TIMES
Source: China Quarterly • *mean percentage across surveys in 2004, 2009 and 2014

China's Population Free Fall – An Economic and Societal Challenge with Likely Long-Term Repercussions



By order of comparison, by 2100 India is expected to have a population of 1.5 billion and the US is expected to have a population of 370 million.

China's Standing Committee just raised the retirement age from 60 to 63 for men and 55 to 58 for women over next 15 years to "expand" the workforce.

Source: Gallup, Financial Times

China's Loss is India's Gain: Rise of a Quiet New Superpower

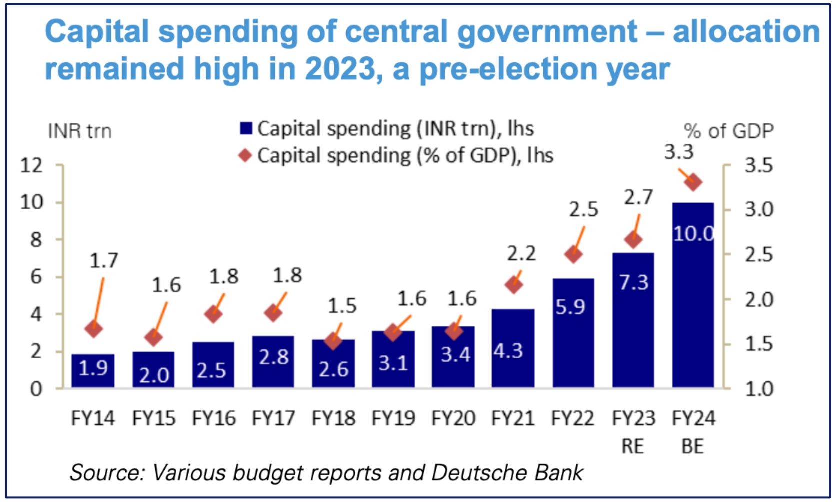
- India is expected to be the fastest growing economy in 2024, experiencing 7.2 percent growth so far in 2022-2023. Its population is now larger than China's, with the average age being 33 years old.
- We are beginning to see a serious outflow of manufacturing from China with a substantial amount of it moving to India. The reasons for going to India?
  - ➢ Low labor costs
  - ➢ Government support/subsidies
  - ➢ Infrastructure
  - ➢ Technology
  - ➢ Education
  - ➢ Rule of Law
  - ➢ Not Communist…
- India is in a growing relationship with the US being driven personally by Prime Minister Narendra Modi. He has built strong relations with both Vice President Harris and former President Trump.
- Modi is also building key Indo-Pacific allies (Japan, South Korea, Australia, Philippines) economically and militarily to counter China.
- The Quadrilateral Security Dialogue (Quad) is potentially the groundwork for a future mutual security/trade alliance between India, Australia, Japan, and the US.

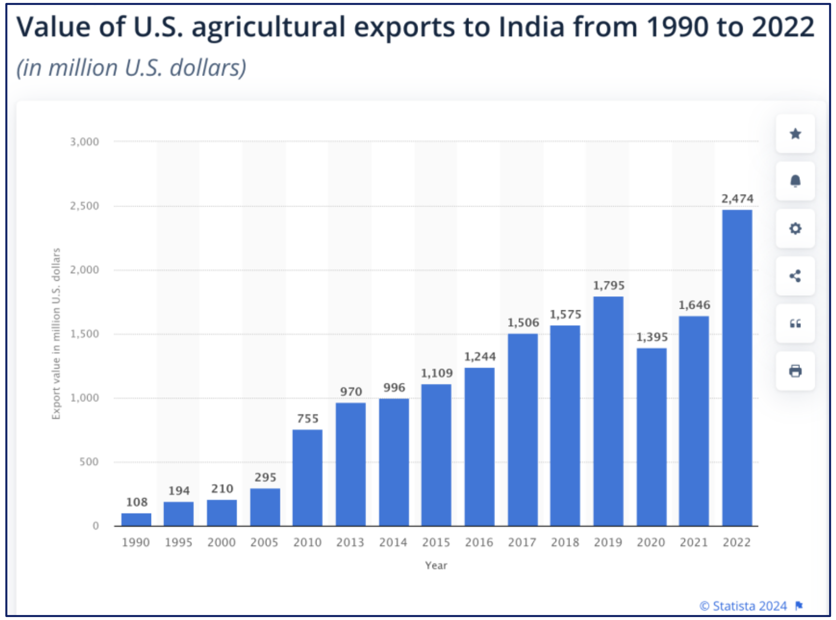
Sources: Reuters, Indian Ministry of Statistics

Prime Minister Modi and the Radical Reshaping of India

- Prime Minister Narendra Modi, was first elected Prime Minister in 2014 and was re-elected again earlier last month. Since taking power, he has driven the country to massive internal reforms and economic reform policies. This has included:
  - Reducing the corporate tax rate from 30 percent to 25 percent.
  - Privatization of major transportation systems including Air India, massive improvement in port systems, movement in offering "one-stop shopping" for government clearances.

- India imports $6.1 billion of consumer food products. Overall, 15 percent came from the United States. The challenges to greater US consumer and agricultural exports to India?
  - US exporters struggling with Indian importers requirements.
  - Preferential trade agreements with other countries.
  - High tariffs and tough rules on food for biotech foods, additives, ingredients.





Sources: Statistica, Deutsche Bank

The Creation of a Global Free Market Alternative to China

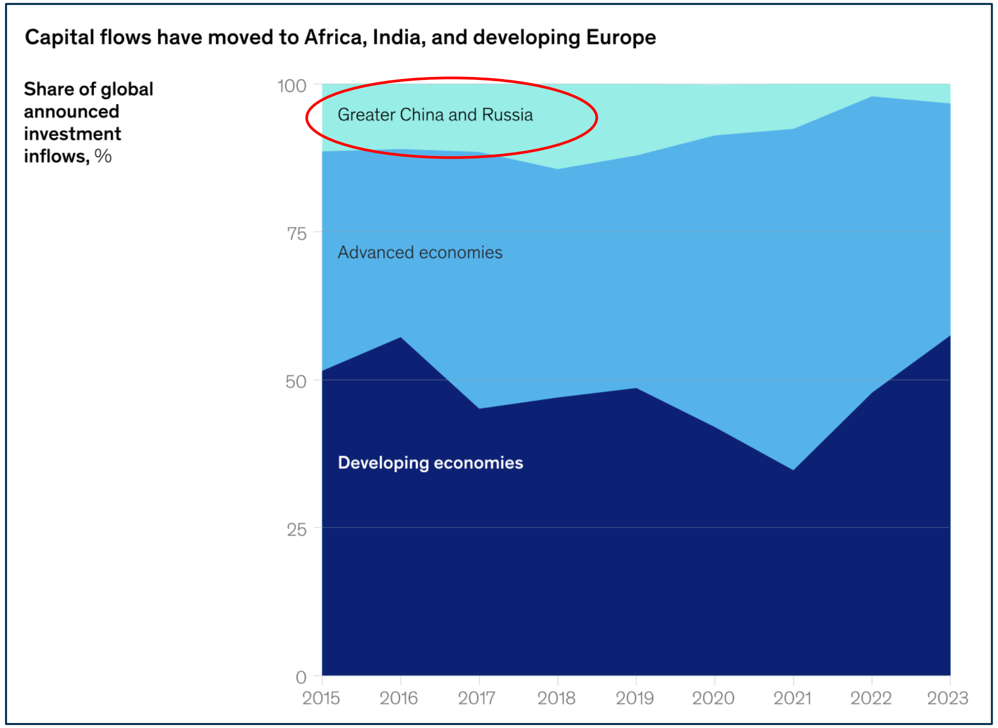
- Long seen as “the world’s factory,” China’s economic transformation/regression is allowing other nations to take manufacturing capacity.

- This is being strongly – but quietly - encouraged by the US and other free market democracies (EU, India, Australia, Japan, South Korea). All in effort to “de-risk,” securing supply chains and encourage democratic development and security.

- The CHIPS Act allows the US to ”explore” opportunities to encourage mutual R&D with foreign allies. Note the US recently announced accessed the CHIPS International Technology Security and Innovation Fund to work with India on developing semiconductor capabilities in India.

- Who are the other countries to watch for similar efforts?

- Vietnam	- Mexico	- Panama
- India	- Malaysia	- Costa Rica
- Singapore	- Philippines	- Kenya
- South Korea	- Indonesia	- Greater Africa



Sources: McKinsey, US State Department

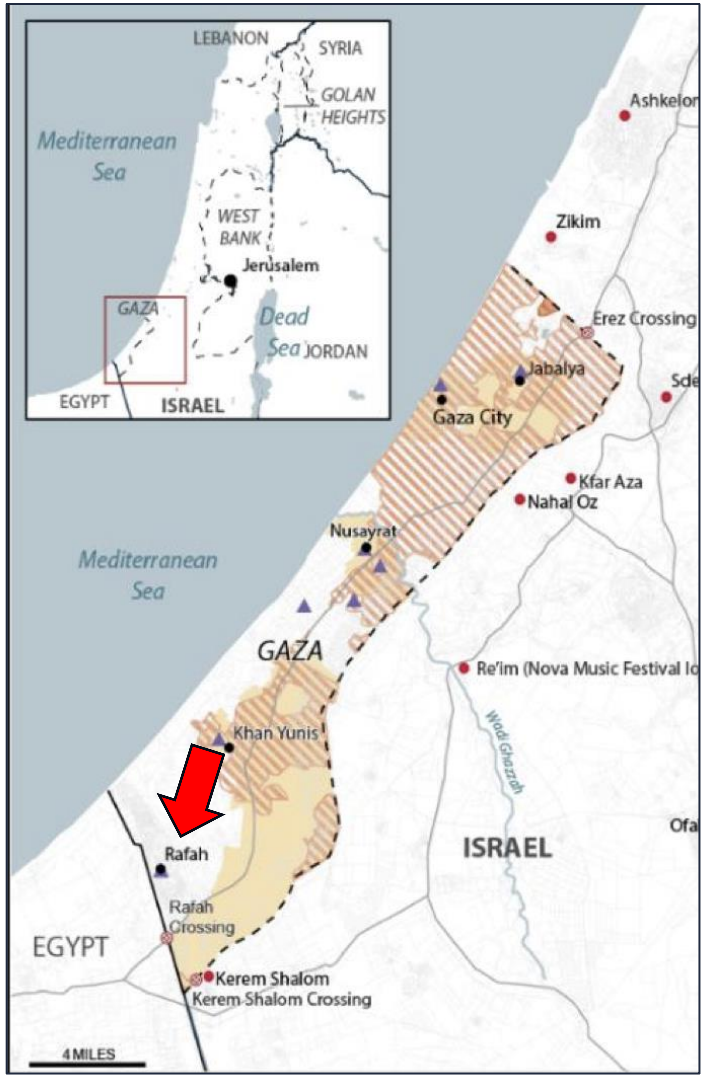
The Middle East: Tell Me How This Ends?

- The grotesque attack on Israeli citizens on October 7, Iran's unprecedented attack on Israel, and now last week's pager/walkie-talkie/cell phone attacks on Hezbollah have changed the political and military reality in the Middle East for the foreseeable future. What should we expect going forward?

  - **Israel:** The overarching question has been what is Israel's Gaza strategy? And are we about to see a new Hezbollah/Southern Lebanon strategy emerge. Now what? There is deep discontent among Israelis toward Prime Minister Benjamin Netanyahu. A recent poll showed 71 percent of Israelis think he should step down now and more than half want elections this fall.

  - **Iran:** Iran seems to not want further direct engagement – but support just enough action to degrade Israel's military and encourage social unrest. **But the pager/walkie-talkie operation is a game-changer.** Iran has to support Hezbollah – but Iran is also too fragile internally and have too much to lose (control of Southern Lebanon and potential further internal unrest). Most of all, they cannot afford to lose their oil revenues.

  - **Other Middle Eastern Countries:** Saudi Arabia, the Gulf States, and other Arab nations do not want to get involved – even to send peacekeeping troops.



Source: Congressional Research Service; the Times of Israel

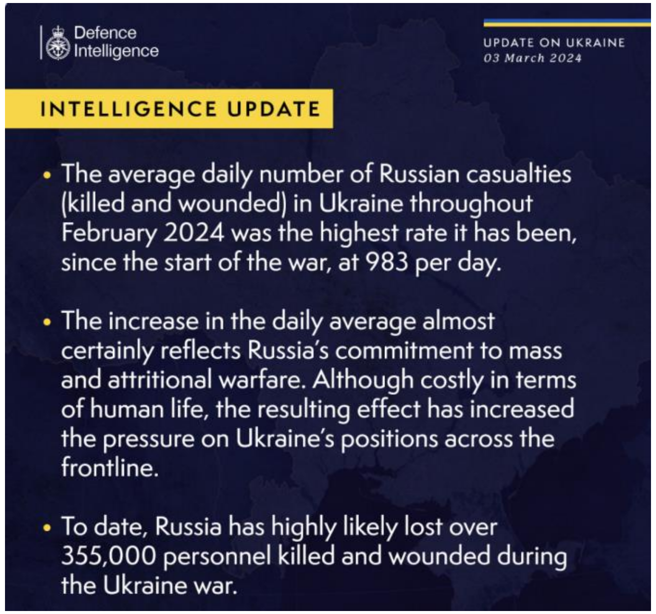
The Ukraine War is Becoming the Endless War

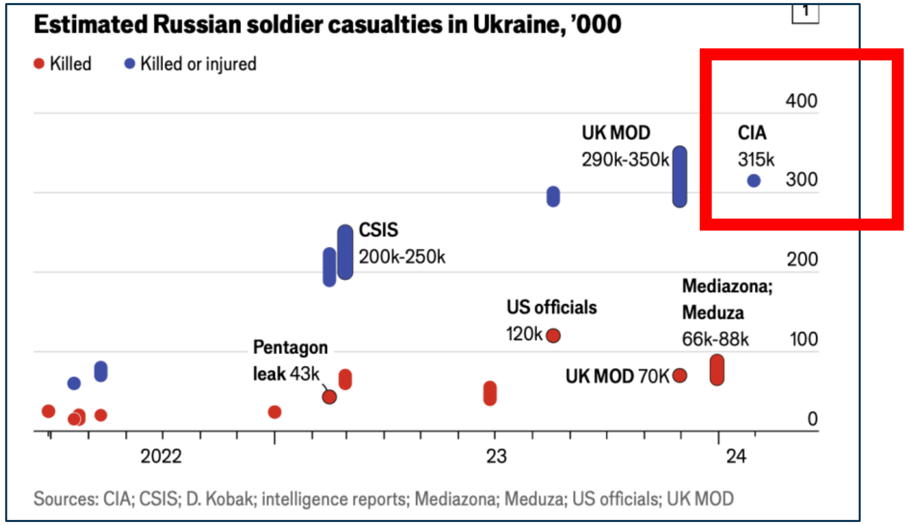
- Moscow's strategy is now clear: A long war of attrition no matter the cost in men and material (which have been staggering in numbers – Russia is losing 24,000 men per month). According to US officials, Russia has effectively reconstituted a lot of their military capabilities, producing or acquiring new artillery, drones, shells, etc. (from Iran and North Korea) as well as mobilizing another 200,000 soldiers via a draft.

- Ukraine had an advantage of morale, quality of equipment (which they are running out of), and operational/tactical capability. But that is weakening rapidly due to a lack of continuous Western aid. They have suffered horrific losses of men (and are now considering mobilizing women to fight).

- What do the US and EU do going forward? There is a growing resistance to endless military and financial aid is growing. Will the West tap out before Ukraine? Or will they allow Ukraine to begin ramping up attacks on Russia itself?

- What is the risk of Russian aggression against Poland, The Baltic nations, Georgia, Moldovia, etc.?





Source: UK Defense Ministry; The Economist; CIA, CSIS, Meduza

NATO's Approval of Long-Rang Western Weapons to Ukraine Likely to Provoke Further Russian "Counter-Measures"

- President Biden, UK Prime Minister Starmer, and other NATO member state are close to approving the supply to and use of long-range missiles ("Storm Shadows") by Ukraine.

- The missiles, which can strike 155 miles inside Russia, could effectively take-out Russian Air Force facilities, supply depots, Russian reserve units, and critical infrastructure. In effect, coupled with the Western supply of F-16 fighters, could significantly change the situation on the ground in Ukraine.
- But Russian President Putin says allowing Ukraine use such missiles would mean "the West is directly at war with Russia." That is a thinly veiled threat that could be acted on in a number of ways including:
  - Escalating clandestine attacks on NATO facilities and troops in Europe.
  - Giving Houthi forces in Yemen more advanced/longer-range missiles to strike shipping.
  - Disabling Asymmetric Attacks: Disabling satellites, cutting critical undersea communication pipelines, massive cyberattacks on Western infrastructure, etc.

The New York Times

Alert Level Raised at U.S. Bases in Europe Over Russian Threats

Officials said there was no specific intelligence about possible Russian attacks on American bases, but Moscow has made vague threats over Ukraine's use of long-range weapons on its territory.

NBC NEWS

U.S., Germany foil alleged Russian plot to assassinate CEO of German arms firm sending weapons to Ukraine

The alleged plot targeted the CEO of Rheinmetall, which provides artillery rounds to Ukraine and plans to open plants in Ukraine to make ammo and armored vehicles.

Source: NBC News, New York Tines, Aviation Week

Other Geopolitical Risks: Here is the Laundry List

- **North Korea –** Increasingly desperate in the wake of COVID which killed an estimated 2 -3 million people (out of a population of 25 million). North Korea is now a major producer of Russian ammunition – which means, they are exporting weapons they would use to threaten the South (minimizing any war threats that Kim Jong-Un might currently be making).

- **Crisis-Induced Mass Migration –** If food security issues worsen (the dissolution of the Black Sea Grain Initiative, famines in Africa and Middle East), experts worry we will see new waves of mass-migration into Europe. We are already seeing the impact in recent European elections.

- **Emerging Market Debt –** There are numerous emerging market countries deeply indebted to China as part of the Belt & Road Initiative (e.g., Sri Lanka, Ghana, Pakistan, etc.) and face defaulting on payment (China has spent more than $250 billion in 2023 already in bail-outs).

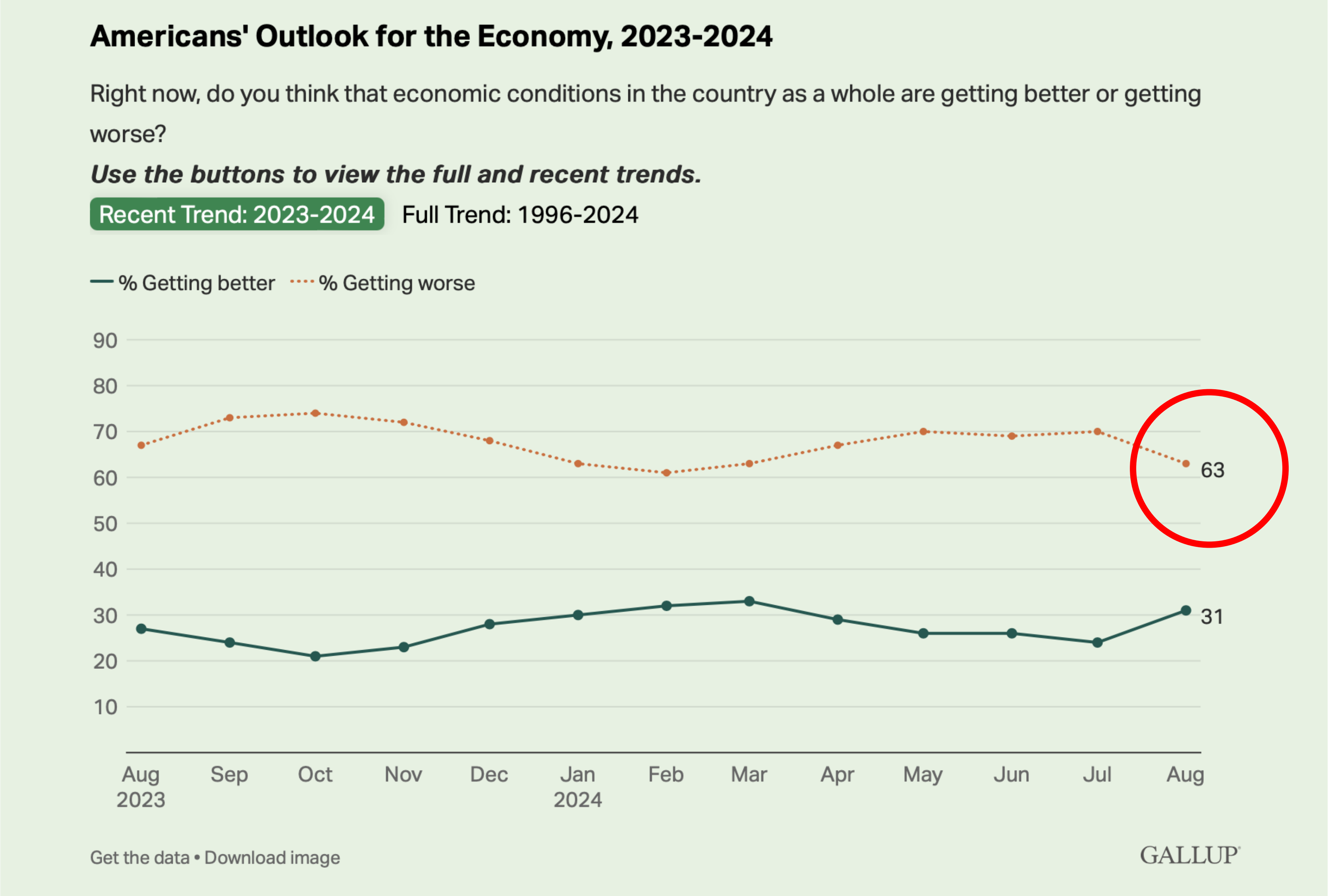
- **Russian/Iranian/North Korean/Chinese/Cuban/Venezuelan Asymmetrical Warfare -** Underwater communications sabotage, satellite sabotage, denigrating/damaging the Ukrainian electrical grid or even Europe's grids, tactical nuclear or chemical or biological attacks in Ukraine (doubtful/unlikely) cyber attacks, **Sabotage of global food supply channels, social media manipulation and use of AI-created "Deep Fakes" going into the 2024 elections (this is a major risk we all must be prepared for as we get closer to November).**

Sources: the Guardian; Reuters; American Economic Association; Office of the Director of National Intelligence

U.S. Markets and Economic Outlook:

Challenging Now. But Is a Strong and Consistent Wind in the Sails Coming?

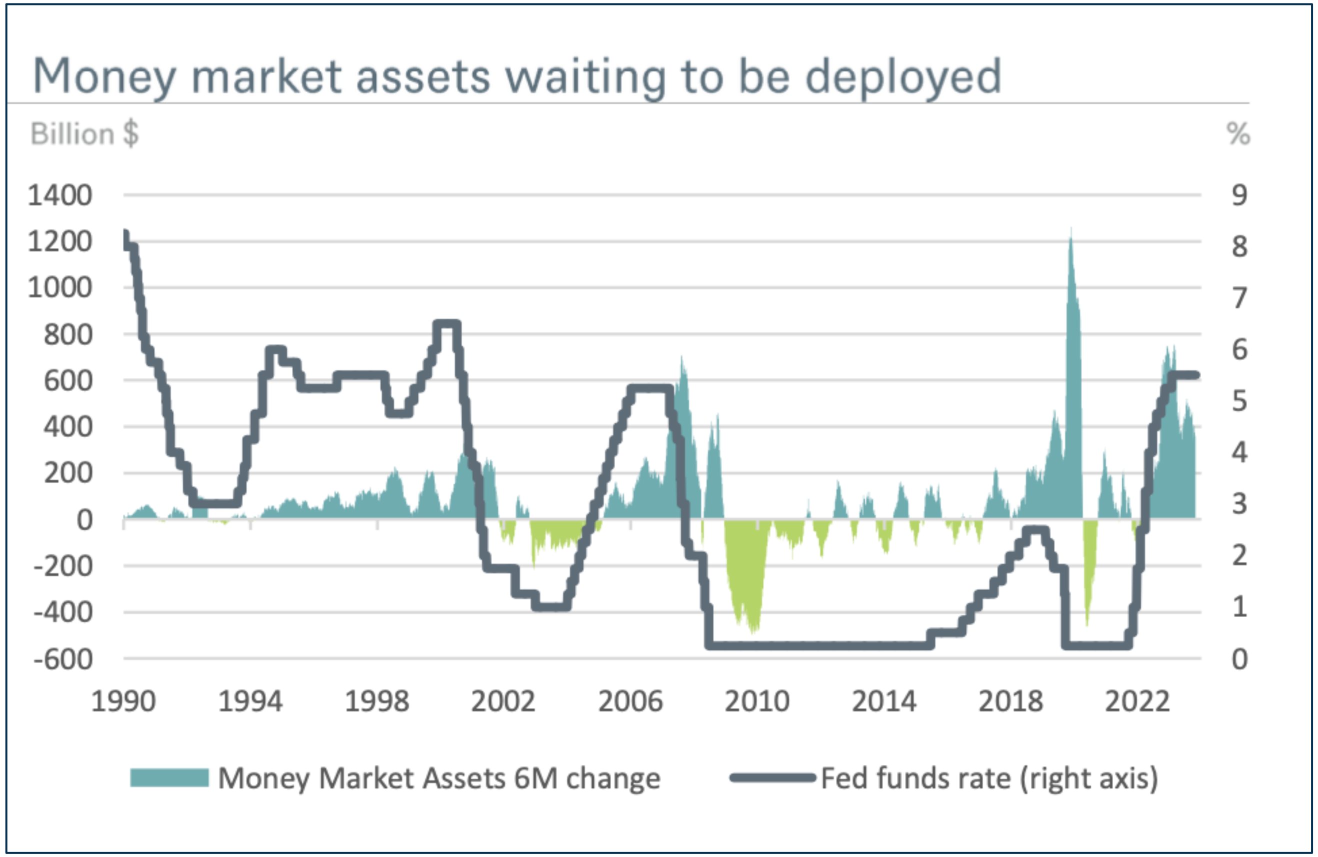
Americans Beginning to See Economy Improving But Still Negative



Source: Gallup Poll August 30, 2024

Money Markets As An Indicator of Investments to Come and Fiscal Tailwinds?

- Money market assets under management are now at record levels.
- But why? Two possible reasons: Investors are taking a wait & see approach to the elections, what the Fed is going to do, and where the economy is going.
- Historically, outflows start 12 months after first cut and get deployed elsewhere.



Source: DWS

What About the Federal Reserve? 50 basis points now and more coming. But Who Will Be Fed Chair in 2026?

- While markets are digesting the 50-basis point cut and new assessment going forward by the Fed, they have not focused on the future make-up of the Federal Reserve Board.

- Jay Powell's term as Chair ends May 15, 2026. Former President Trump has made clear he will not re-nominate Powell and has said his shortlist includes Art Laufer, former Chair of the Council of Economic Advisors Kevin Hassett, and former Fed Governor Kevin Warsh.

- But markets have not taken much note of the fact that then-Senator Kamala Harris strongly opposed Powell's nomination as Fed Chair in 2018, joining seven Progressive Democrats in voting against him.

- What does that mean between now and then? We believe Powell will be ready to leave by 2026, having guided rates downs without causing pain to the economy. His "invisible earmuffs" are on and the risk of politicization of Fed policy is non-existent.

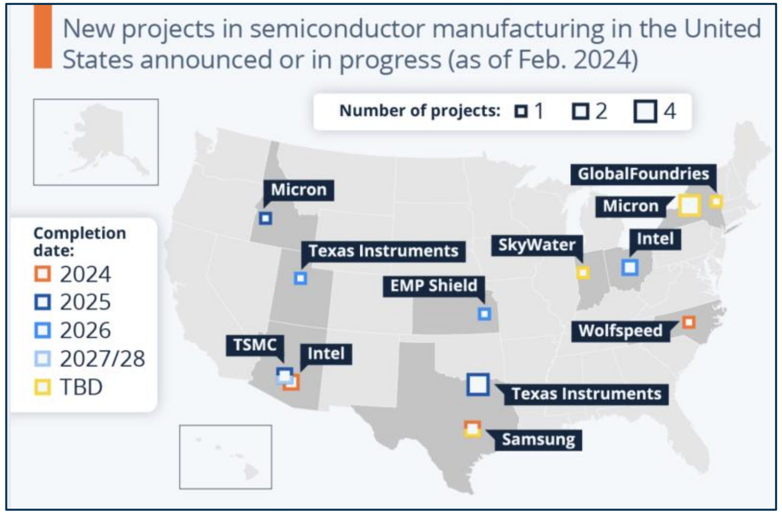
- One other Fed Governor's seat opens up in 2026: Fed Governor Adriana Kugler's term ends on January 31, 2026.

The Staggering Federal Debt is on Track to Grow from 100 percent to 200 percent of GDP

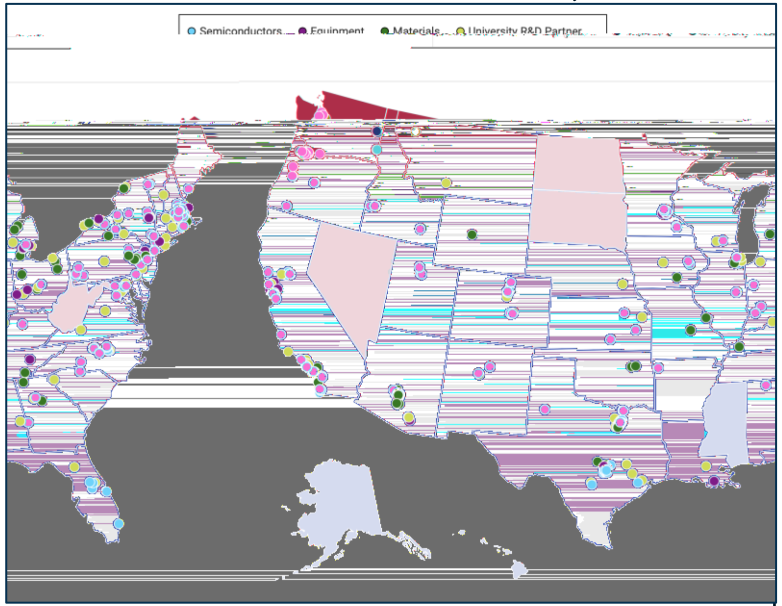
Source: Apollo Capital Management Chief Economist Torsten Slok, CBO, Haver Analytics

Industrial Policy in America: The Drive for US Chip Supremacy

- Semiconductor production in the US is the one area where bipartisanship presides in Washington all in the name of “national economic security.”
- The Biden Administration and Congress took up this challenge in 2022 by passing the CHIPS Act which grants close to $100 billion in federal funding on building up the chip industry. Three examples:
  - Intel broke ground on a new $20 billion facility in Columbus, Ohio and $20 billion plant in Arizona.
  - Micron broke ground on a $15 billion expansion in Boise, Idaho and announced a new ***$100 billion*** build-out over 20 years in New York – the largest in the world.
  - Samsung was just awarded more than $6 billion to build new semiconductor facilities in Austin, Texas.
- Combine this with the $550 billion funding from the Infrastructure bill also passed in 2022, and it is a potential boom for numerous sectors, particularly for commercial real estate, residential real estate, etc.
- **Who else qualifies under CHIPS? The Pharma industry?**
- **What are the chances of CHIPS 2.0?**



The U.S. Semiconductor Ecosystem



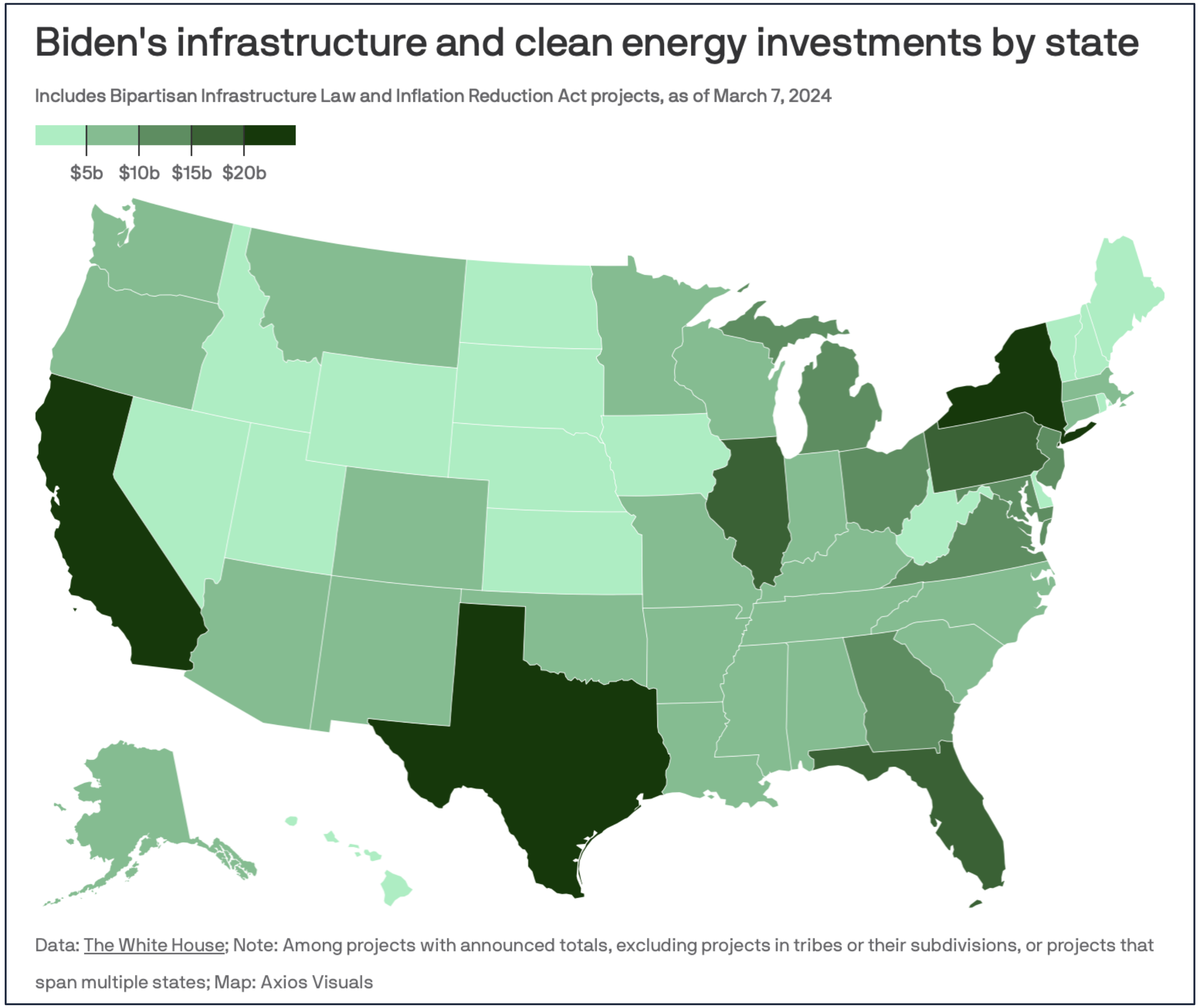
Source: Semiconductor Industry Association

Which States Are The Biggest Beneficiaries of The Inflation Reduction Act?

- More than $479 billion of infrastructure and clean-energy spending is being pumped into the economy due to Bipartisan Infrastructure Law and the Inflation Reduction Act.

- **A large number of these investments are going into Red States** – which means, even if Biden loses in November, it will make repealing these two laws hard to do.

- **"As much as some Republicans have criticized Biden's economic programs, those [Republican] governors aren't going to want to see the investments... reversed."**
  – US Energy Secretary Jennifer Granholm



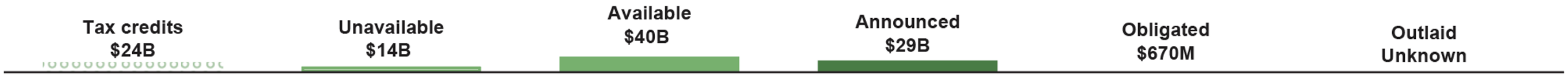
Sources: The White House, Axios

Less Than 2 Percent of Available CHIPS Funding Has Been Awarded and Only 40 Percent of the Infrastructure Bill Funding Has Been Awarded

CHIPS AND SCIENCE ACT

Less than 2 percent of available CHIPS funding has been awarded

$54 billion total appropriations, $24 billion estimated tax credits



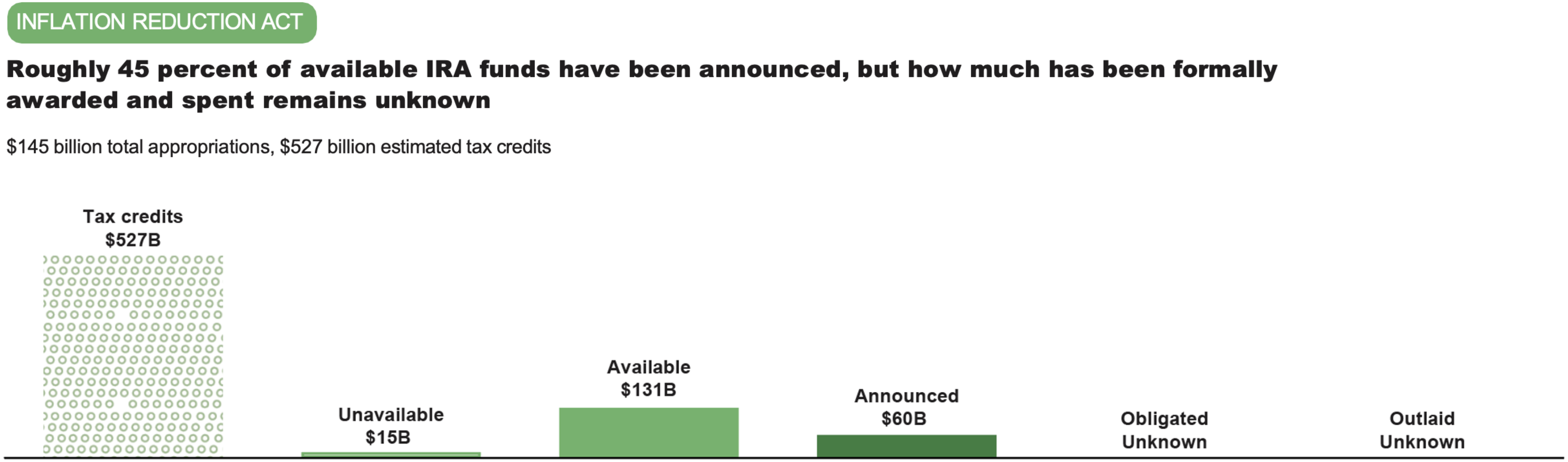
BIPARTISAN INFRASTRUCTURE LAW

Less than 40% of available funds have been awarded under the infrastructure law; 16% has been spent

$838 billion total appropriations

Source: Politico

And 55 Percent of the Inflation Reduction Act Funding Has Yet To Be Spent



Source: Politico

The Grid Challenge: It is a $1 Trillion Investment Requirement

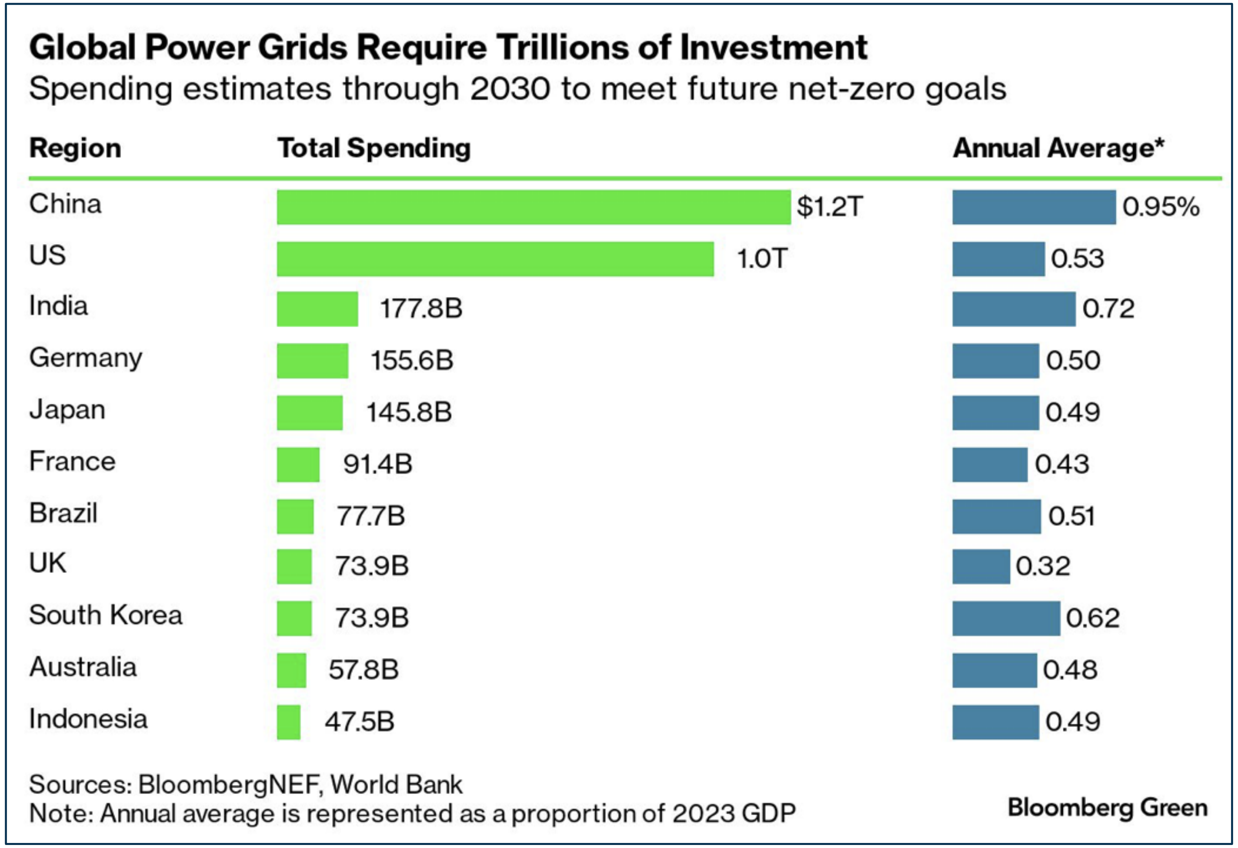
- The US electrical grid is facing unprecedented new demands. Wind, Solar, Crypto Currency, Artificial Intelligence are putting extraordinary demands on the system. In short, there are enough power lines, and many existing lines need to be replaced.

- But the grid is fragmented and has created *"the interconnection queue"* – a long line of projects waiting to get connected. How much? 1,5000 gigawatts, roughly 1/3 of all power currently produced in the US.

- In essence, there are three overarching systems: One in the East, one in the West, and one in Texas.

- And within these three systems are a patchwork of operators who compete – making it harder to build long-distance lines to transport wind and solar generated energy.

- Replacing existing copper wiring with carbon fiber wrapped in aluminum would allow a doubling of the amount of power to be pushed through the system.



Source: Bloomberg; New York Times, USEIA, Washington Post

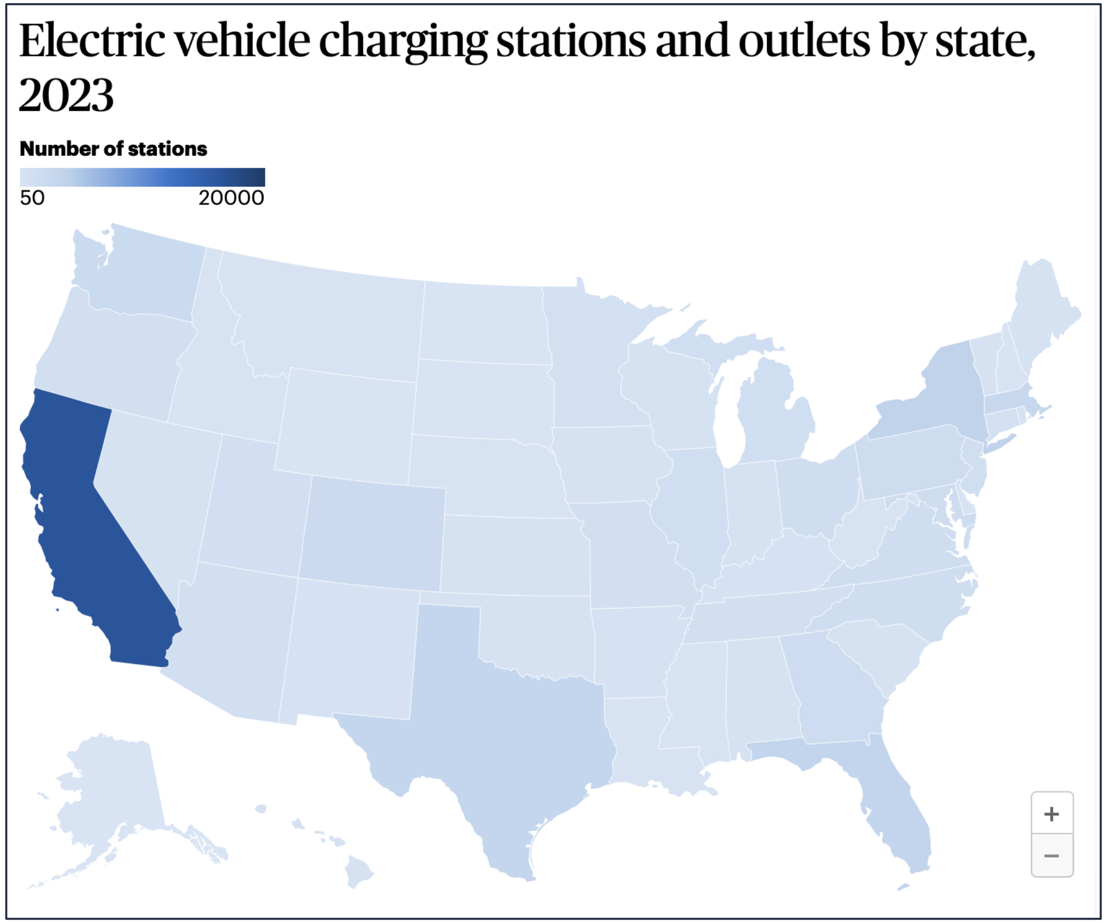
But There Needs to Be Refinements: Congress Has Some Tough Questions About EVs, the SPR and Other Issue

As the future of EVs is debated and all that the IRA and Infrastructure bill is directed to spend, Congress has some questions and is going to hold tough hearings this year:

- Two years after President Biden vowed to spend $7.5 billion (via the Bipartisan Infrastructure Law) to build 500,000 charging stations by 2030, **a grand total of seven stations offering 38 charging spots in four states have been built** (so far, only in New York, Hawaii, Ohio, Pennsylvania). Why and where has the money been spent?

- The Strategic Petroleum Reserve (SPR): Where are we in refilling it and when will it get done? President Biden tapped the SPR in 2022 in an effort to lower gas prices. But it has not been refilled. To do so would require the Department of Energy to buy one million barrels a day. DoE is buying one million a week . Why? One million a day would seriously spike the price of oil. But isn't there any other way?

- The EPA's new Emissions Standards: How Will the US possibly meet the the Biden Administration's 2032 EV requirements?

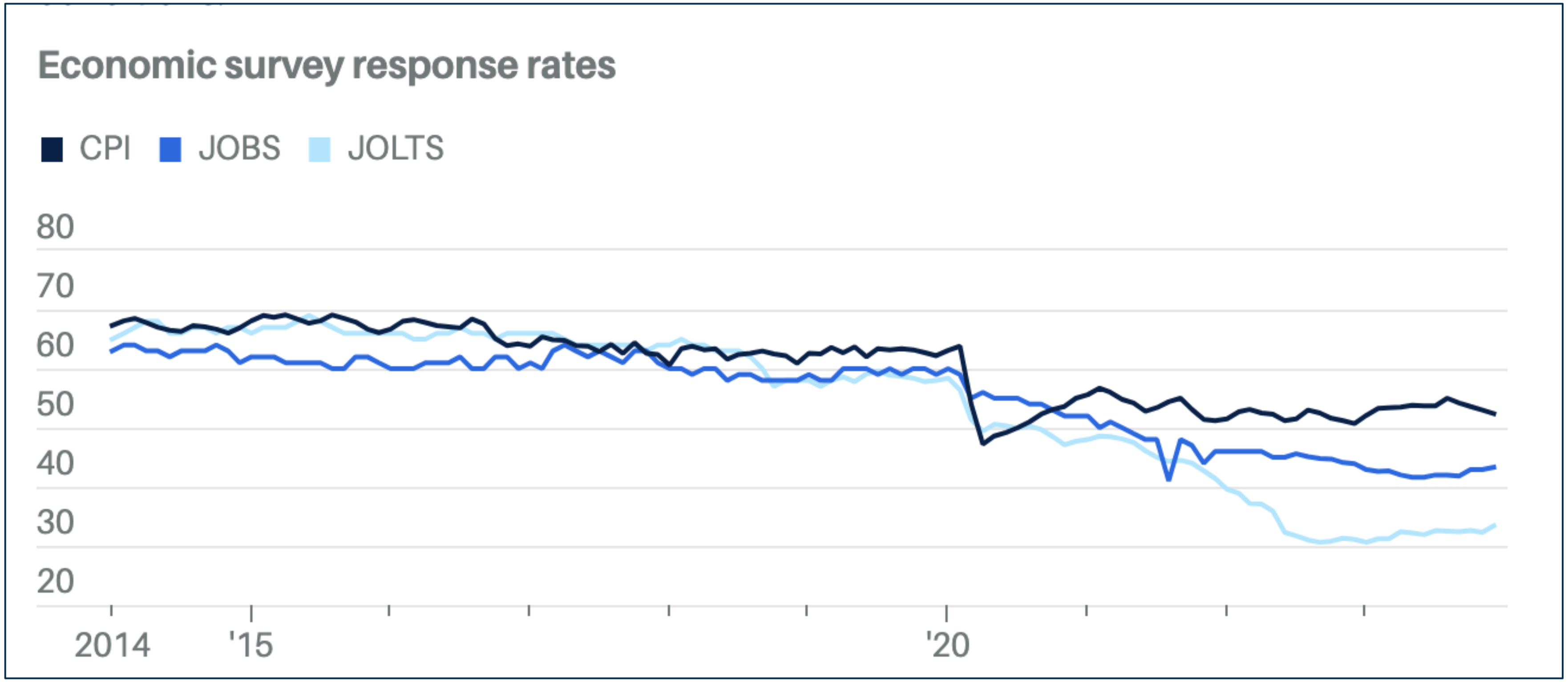


Sources: US Department of Energy, Washington Post, CNBC

Barron's: "The Fed Depends on Increasingly Questionable Data. That's a Problem."

"The response rates for commodities and services portions of the consumer price index were down roughly 10 percentage points in January from pre-pandemic levels….Another source of concern is the seasonal adjust to smooth modeling that the agency performs to smooth data series and provide more useful comparisons between observation periods." – Barron's Magazine

- ➢ This is why the Federal Reserve is talking now about the "totality" of the data it seeks to examine.

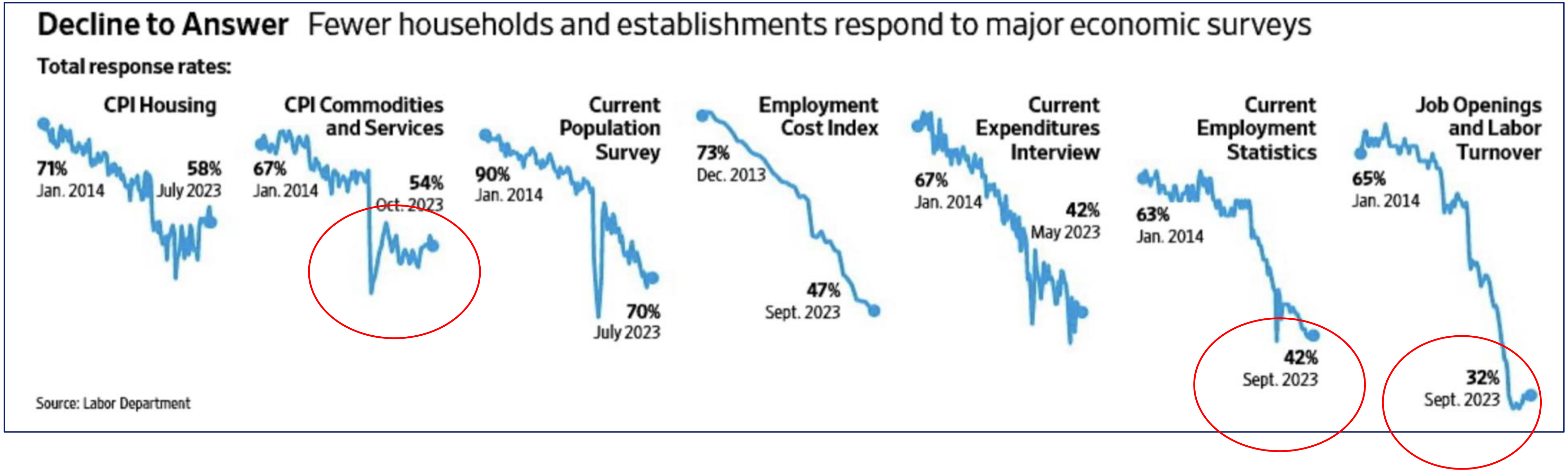


Barron' May 10,2024; Graph from Bureau of Labor Statistics

Drilling Into That Missing Data: What Aren't We Seeing?

There is no clear explanation as to why businesses are not participating as robustly as they have done in past critical federal economic government surveys.

Which Surveys are seeing the worst response rates?



Source: Labor Department; Wall Street Journal

The Federal Courts and US Regulators: The Chevron Decision Changes Everything

- One thing you can always count on in an election year in Washington: As Congress increasingly grinds to a halt in passing legislation, regulators ramp up their regulatory work stream.

- The Supreme Court just passed down the highly-contentious Chevron Decision. This is going to have an enormous impact on federal regulation of all sorts going forward and likely lead to the repealing of a number of federal regulations.

- The Federal Reserve, the SEC, CFTC, OCC, CFTC, NCUA, and other financial regulators are all on the hot seat.

- But the FDA, FERC, and every other non-financial regulator is sharing that hot-seat. Watch the cascade of federal lawsuits from interest groups seeking to pull out regulations in place for years.

What is Washington Going to do Between Now and the 2024 Elections?

To the Question of What Else Congress Will Do Before the Election…

Not much. Except….

- Will we see a government shutdown? Speaker of the House Michael Johnson (R-LA) wants a quick vote on a Continuing Resolution (CR), punting appropriations votes until at least after the November elections and perhaps until February 2025.

- But a growing number of conservative House Republicans want amendments added – such as voting security measures which Biden will veto – that threaten to keep Congress in session and shutdown – which would likely be politically disastrous to Republicans.

- And we have reason to believe that Conservative House Republicans are laying down the predicatge for replacing Speaker Johnson in January with one of their own.

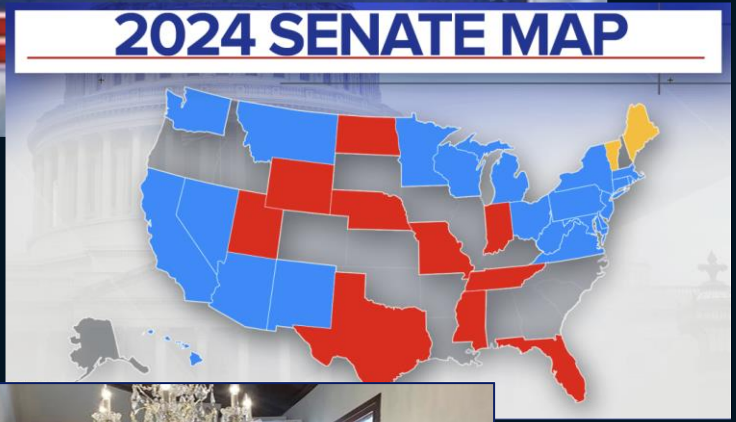
Tax Reform 2025 – 2026: "The War of the White Papers" Has Begun

- We see no chance of major tax legislation at the federal level for the remainder of 2024 (including a legislative effort that is ongoing in the Senate to pass a small corporate tax package of "tax extenders").
- But as soon as the election is over with, tax reform will be the top legislative priority of the new Congress and the White House. Much of the Trump 2017 tax provisions "sunset" at the end of 2025.
- For now, we are experiencing the "War of the White Papers" Tax advocacy groups, think tanks, political groups all laying out ideas and analysis for tax reform after the 2024 elections. It is a lot to take in but important to pay attention to because this is where "new" tax ideas and proposals germinate.

Corporate	Individual
Increase or decrease corporate tax rate/ Raise tax on stock buybacks	Raise the SALT Deduction Cap
Increase global minimum tax rate to 15 percent	Increase The Top Marginal Tax Rate for those earning more than $400,000 (Billionaire Tax)
Make Larger Current Tax Extenders	Enhanced Child Tax Credits
Revisit Getting Rid of Carried Interest	Raise Inheritance Tax Rate
Tax Incentives for "Near Shoring"	Wealth Tax/Surcharge on Wealth Levels ("Billionaires Tax")

US Elections, Policy, & Markets

What to Watch in 2024 - 2025



The Election Timeline: What Will Voters and Markets be Watching in the Coming Three Months

Aug. 19-22
Democratic National Convention in Chicago

Democrats held a virtual vote to confirm the nominee before August 7 to avoid legal complications related to Ohio's ballot access law. A number of additional states have filing deadlines for ballot access that precede the adjournment of the Democratic convention on August 22, so a **virtual vote ensured legal challenges cannot be raised over provisional certifications.**

Sept. 1
Ohio's Deadline to Certify Candidates for Ballot

Sept. 4
Fox News Presidential Debate

The Harris Campaign **has not yet agreed** to this Trump-proposed debate.

Sept. 10
ABC Presidential Debate

Sept. 18
NJ-10 Special Election

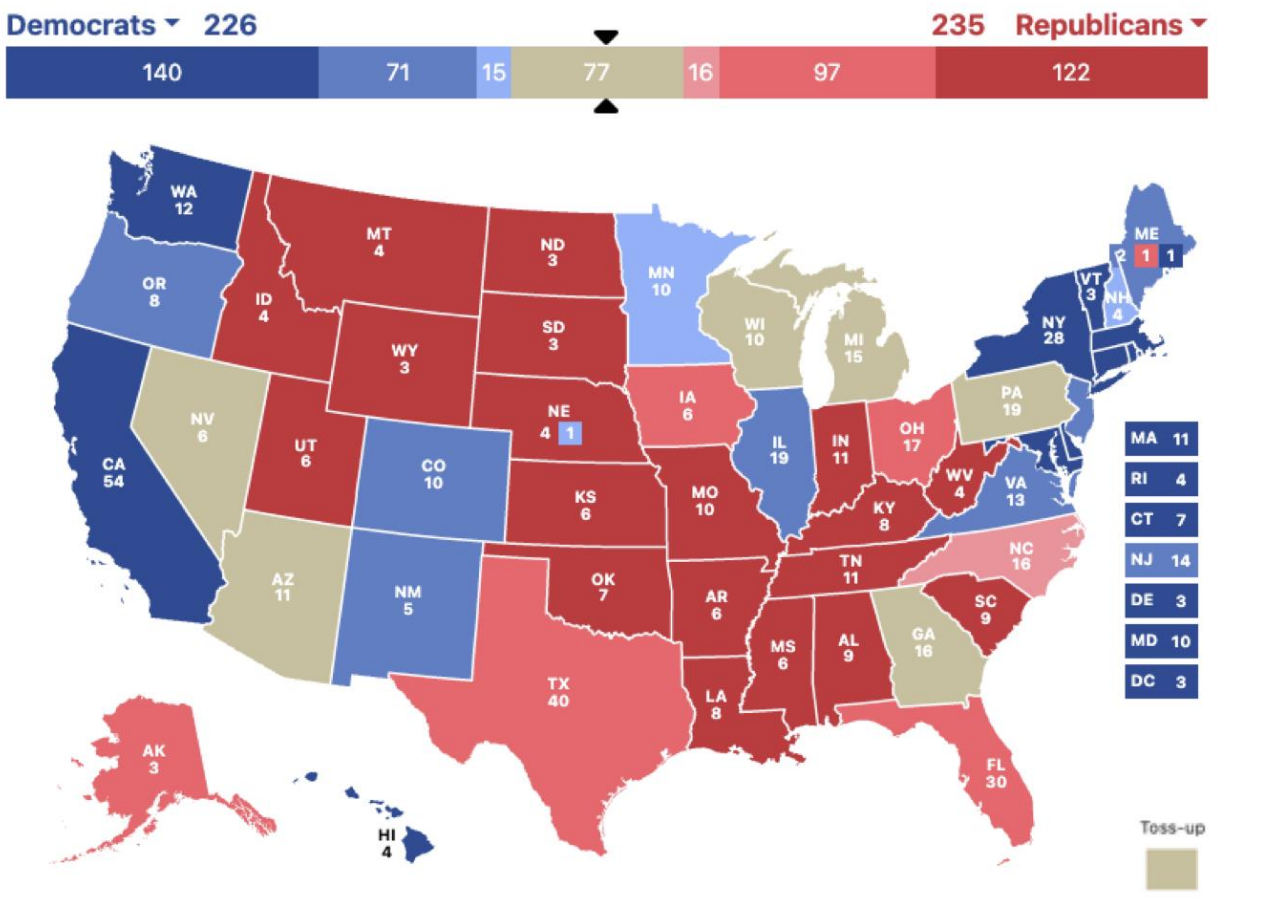
Sept. 25
NBC Presidential Debate

The Harris Campaign **has not yet agreed** to this Trump-proposed debate.

Oct. 1
Vice Presidential Debate

Nov. 5
Election Day

The 2024 Presidential Election as of This Week Per Polls



Swing State Switch:

*Last week, Cook Political Report changed its ratings for **Georgia**, **Arizona**, and **Nevada** back to "**Toss Up**" from "**Lean Republican**." **North Carolina** remains ranked "**Lean Republican**."*

Republican

Trump

Democrat

Harris

Independent and Third Party

West

Stein

Oliver

The Deciders: Both Parties Fight for the Black Vote Like Never Before

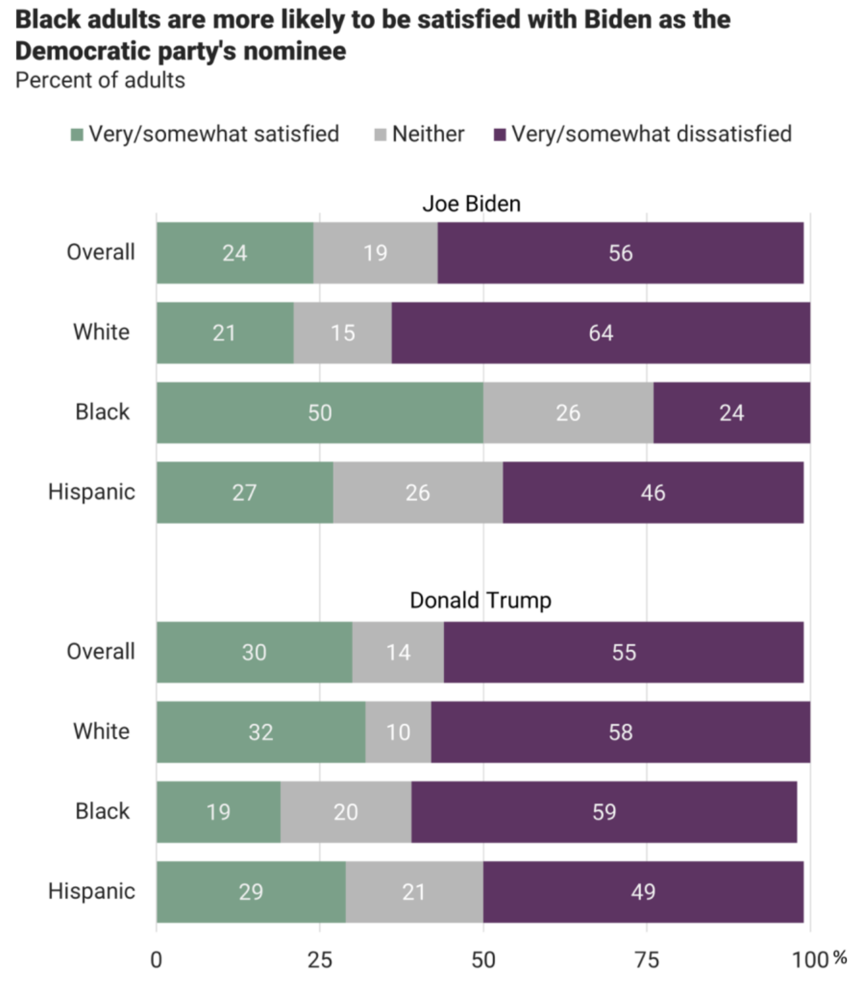
- Republicans and Democrats are paying more attention and spending more money than ever in their Black voter outreach. The primary focus in on Black men.

- While national in focus, the locus (for now) is Georgia where Black voters are the second-largest voting bloc and make up 30 percent of Georgia's active voters.

- Trump sees a large opportunity in Georgia – and nationally. A May 2024 New York Times/Sienna College poll of battleground states showed 23 percent of Black voters are supporting Trump, up from 12 percent in 2020.

- But there has been, overall, only a slight uptick in Black men who identify as Republican. And overall, Trump remains unpopular among Black adults. According to an AP-NORC Center for Public Affairs Research Poll have a "somewhat or very unfavorable view of Trump."

- Nevertheless, Trump continues to aggressively court the Black vote as he sees/understands it is a voter block that can make the difference between victory or defeat.



Question: How satisfied are you that each of the following individuals is their party's likely nominee for president in 2024?
Source: AP-NORC poll conducted June 20-24, 2024 with 1,088 adults nationwide.

Source: AP-Norc Center, New York Times, Pew Research,

The Deciders: The Growing Latino Vote in the US

- The Latino vote has also emerged as an increasingly important – indeed, critical – voter block for both parties.

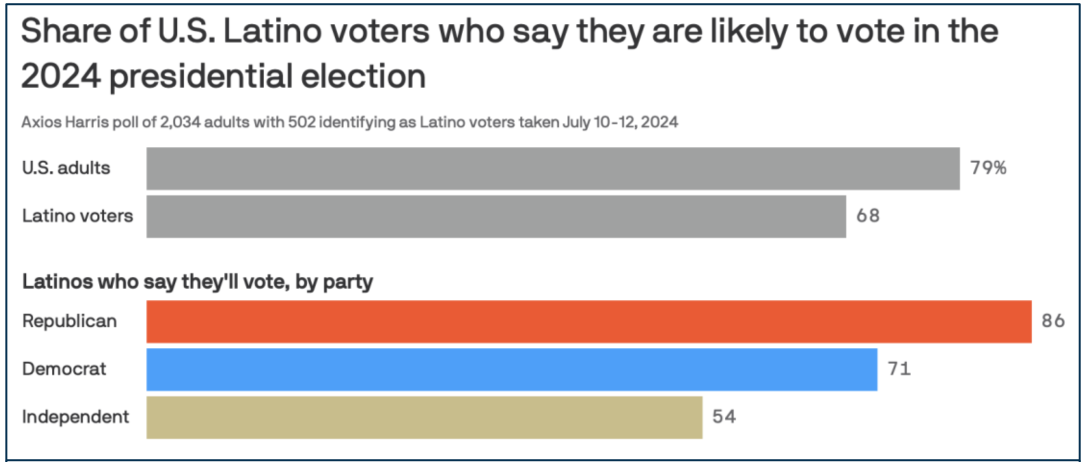
- An estimated 32 million US Latinos are now eligible to vote in 2024, an all-time record. It is projected that this could account for almost 15 percent of all eligible voters in November.

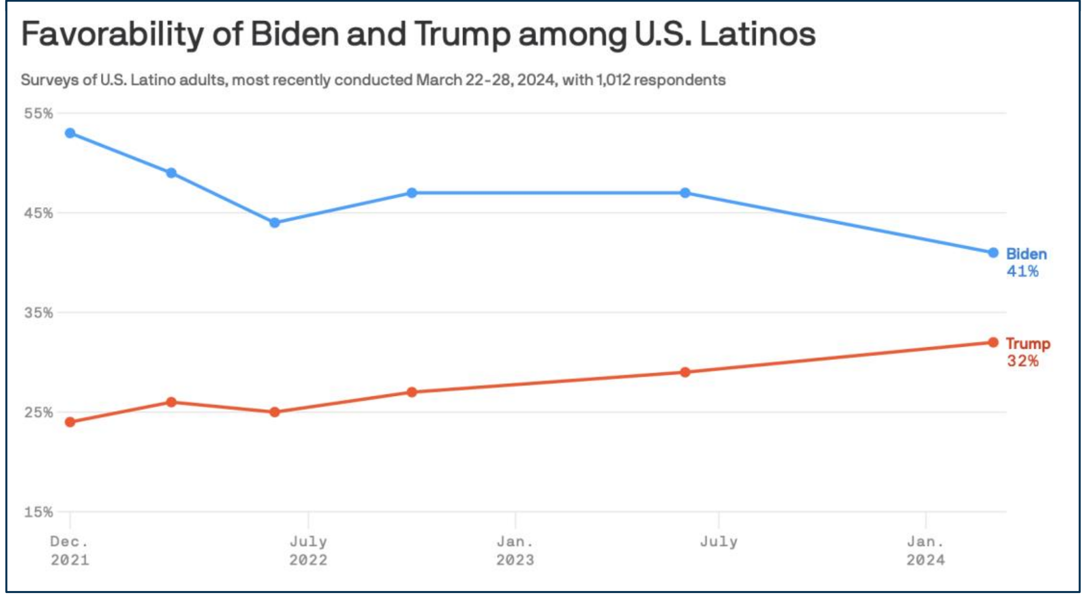
- 31 percent of them are between the age 18 to 29, a demographic pollsters have struggled to get significant data on.

- In the 2024 election cycle, Latino Republicans are showing significant energy and determination to vote versus Latino Democrats (but, for now, that is a Democratic Party-wide trend).

- Like the Black vote, Georgia – as well as Arizona and Nevada – are seen as the key battleground states to win the Latino vote.

  - As a benchmark, 59 percent of Latinos voted for Biden in 2020.





Sources: Axios Vibes Survey,

The 2024 US Senate Outlook: Can Democrats Hold Control?

Democrats must defend 23 of the 33 seats up in 2024, many in states that have become more Republican. Likely Republicans win control of the Senate.

Democrats at Risk:

1. Sherrod Brown (D-OH)*
2. Jon Tester (D-MT)*
3. Joe Manchin (D-WV)*
4. Jackie Rosen (D-NV)
5. Bob Casey (D-PA)
6. Tammy Baldwin (D-WI)
7. Open Seat (MD)

Republicans at Risk:

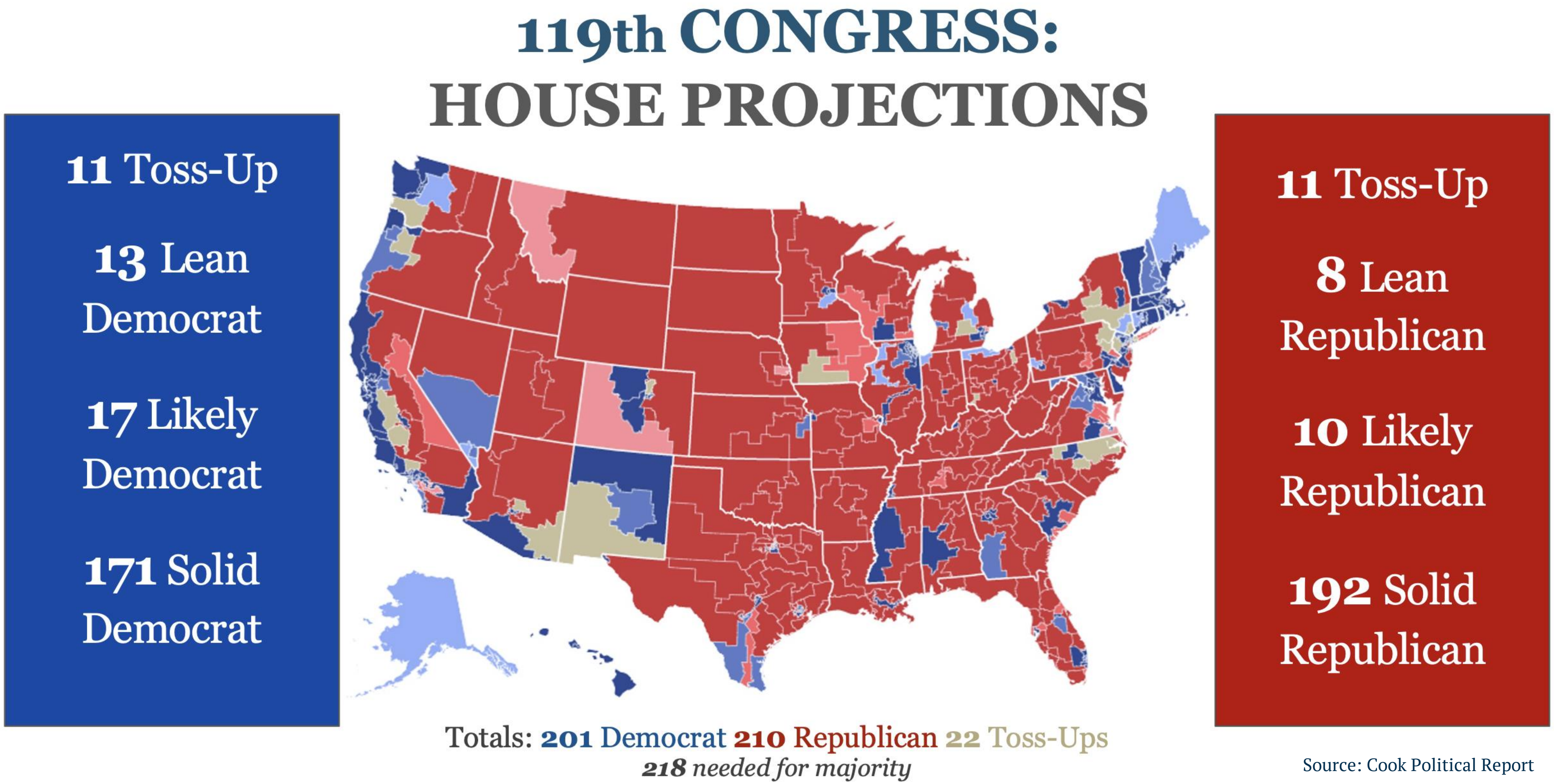
1. Ted Cruz (R-TX)
2. Rick Scott (R-FL)

Independent Seats:

Arizona (Senator Krysten Sinema is not running for re-election)

*** = Trump won their states – Ohio, Montana, West Virginia – in 2016 and 2020**

The House of Representatives: Will The GOP Hold or Will Democrats Grab A Victory?



Source: Cook Political Report

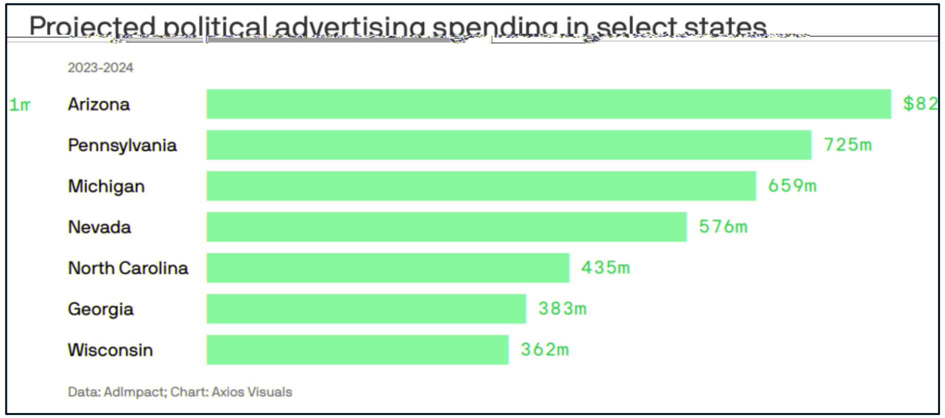
If You Think You Are Seeing A Lot More Political Ads this Election Cycle Than Ever Before, You Wouldn't Be Wrong…

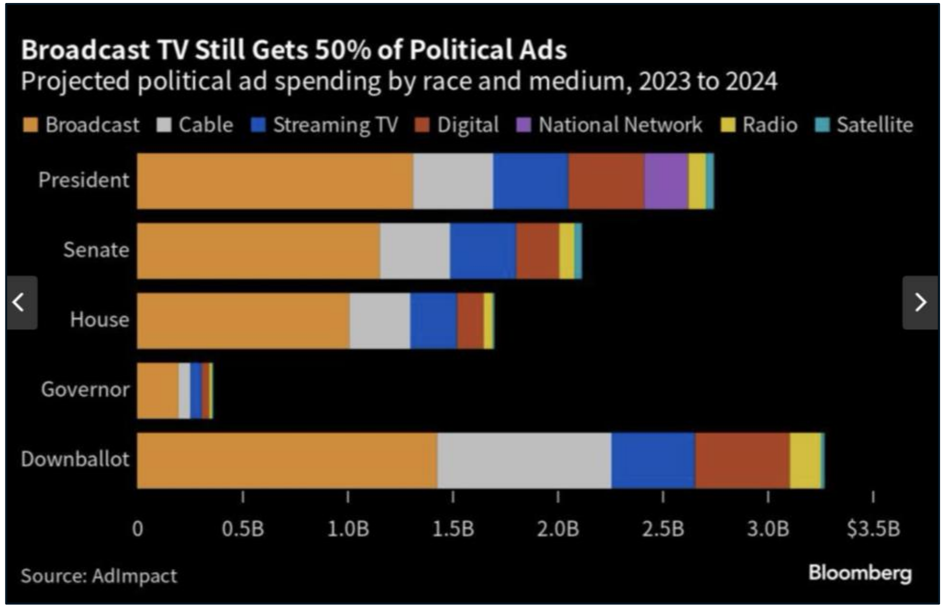
- **Political spending on advertisements this election cycle is expected to surpass $12 billion – a 16 percent increase from 2020 expenditures.**

- **How much was spent in 2016? $2.6 billion.**

- Breaking it down, estimates are:
  - ➢ Presidential campaigns will spend in excess of $3.0 billion (individual and outside groups combined)
  - ➢ Senate campaigns will spend in excess of $2.1 billion
  - ➢ House campaigns will spend in excess of $1.7 billion
  - ➢ Gubernatorial campaigns will spend in excess of $361 million
  - ➢ And more than $3.3 billion will be spent on all the other elections (various statewide offices, state house and senate races, city councils, etc.)

- Republican presidential candidates have already spent more than $100 million so far.





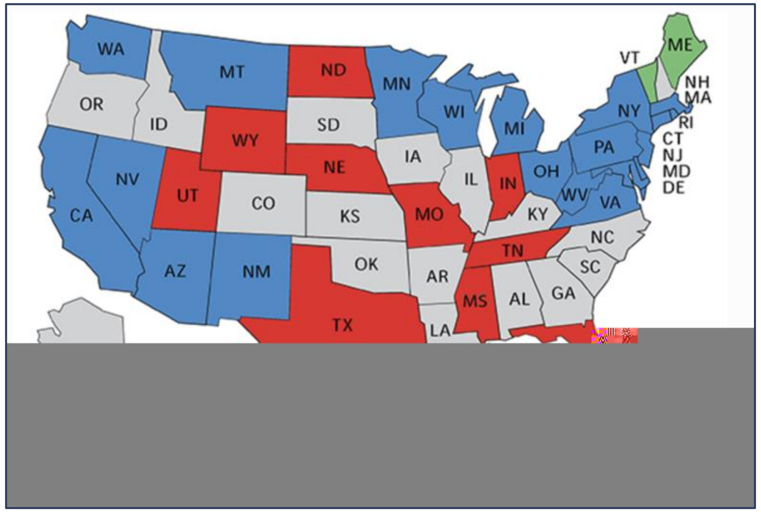
Appendix: The US Election 2024: Who is Up for Election?

- **Election Day: November 5, 2024**

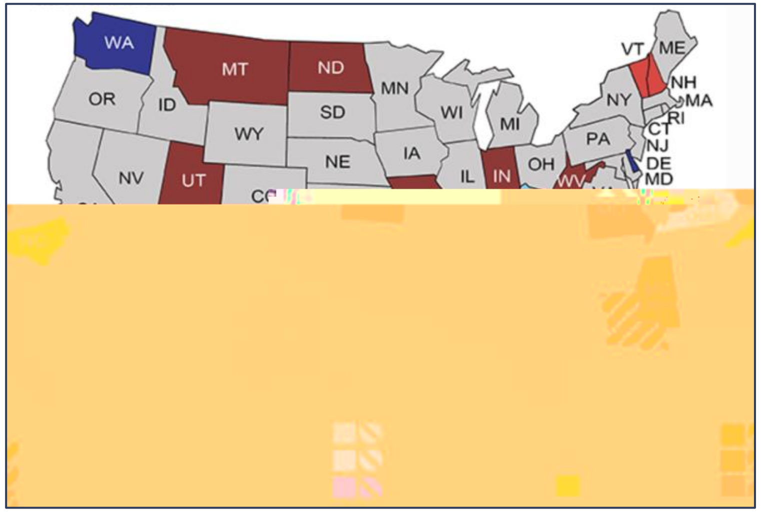
  - ***Who is up for election?***
    - ➢ The President and Vice President
    - ➢ 435 Members of the House of Representatives
    - ➢ 33 Members of the US Senate
    - ➢ 11 Governors and Lieutenant Governors
    - ➢ 10 State Attorney Generals
    - ➢ 86 State legislatures in 44 states plus 8 legislative chambers in US Territories
    - ➢ 22 major city mayors
    - ➢ Hundreds of state and local judges

- January 25, 2025 – The new President and Vice President and all members of the new Congress are sworn into office.

States with Senate seats up for election



States with Governor seats up for election



Source: University of Virginia Miller Center for Politics

Fulcrum Macro Advisors LLC Leadership

Frank Kelly

Frank is the Founder and Managing Partner of Fulcrum Macro Advisors LLC. He has worked as a senior executive on Wall Street for over 30 years, most recently at Deutsch Bank. Prior to this, he held senior positions at Charles Schwab & Co., and Merrill Lynch where he was Chief of Staff and Global Head of Marketing.

At Deutsche Bank, Frank served as Global Coordinator for Government and Public Affairs. He was also the Bank's first Chief Political Strategist, advising clients on geopolitical and domestic policy issues.

Prior to joining the financial services sector, Frank was Chief Spokesman and Senior Policy Advisor to the Chairman of the US Securities and Exchange Commission. Previous to this, Frank served at the US Department of Justice in the Office of Policy Development where he focused on international and national security issues. He began his career as a Writer for President Ronald Reagan, going on to serve as the Deputy Associate Director of the Office of Political Affairs. He remained at the White House to serve as a Writer for President G. H. Bush.

He is also a Senior Advisor to The Scowcroft Group, a Washington DC global business advisory firm with an emphasis on emerging markets. He is also a Senior Associate in the Americas Program at the Center for Strategic and International Studies (CSIS). Frank additionally is a Lecturer at The Catholic University of America's Busch School of Business where he teaches on Business Intelligence.

Frank is a member of the Council on Foreign Relations, the International Institute for Strategic Studies, the American Council on Germany and American Institute for Contemporary German Studies. He also serves on the Board of Directors of Codespa America and as Vice Chair of the Board of Directors of the Jerome Lejeune Foundation of America.

He resides outside Washington DC in Great Falls, Virginia with his wife, Maura, on their working farm, Open Door Farm.

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Frank Kelly - https://twitter.com/FulcrumMacro

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Important Information

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Michael Jordan, CEO, Dockside Platforms

Mr. Jordan is the Chief Executive Officer of Dockside Platforms, which launched in January of 2023. Mr. Jordan oversees the Dockside Platforms business and its day-to-day operations.

Prior to joining Dockside, Mr. Jordan was a Managing Director and Head of Capital Introductions with Genesis Global Trading. Prior to that, Mr. Jordan spent 16 years with Morgan Stanley, where he was the U.S. Head of Capital Introductions, Asset Owner Solutions and Prime Brokerage Content.

Mr. Jordan graduated from New York University with a B.S. in Finance and Information Systems. Mr. Jordan is a CFA Charterholder.

Chris Connor, Founder and CIO, Ardmore Road

Chris Connor is the Founder and Chief Investment Officer of Ardmore Road. Chris has over 20+ years of investment experience focused on the Technology, Internet, Media and Communications sectors. Prior to Ardmore Road, Chris was a portfolio manager at Citadel Global Equities where he managed a $2.5BN Technology Portfolio. Prior to Citadel, Chris was the founder and portfolio manager of Ardmore Global Investors, a Technology hedge fund he launched with colleagues from JAT Capital. Prior to founding Ardmore Global, Chris was a day 1 team member at JAT, where he served as Partner and Senior Technology Sector Head. Prior to joining JAT, from 2003 – 2007 Chris was a Vice President and Senior Analyst at Morgan Stanley FrontPoint's Stadia Capital. Chris began his career as an Investment Banking Associate at Credit Suisse First Boston. He earned his J.D. from New York University School of Law and B.A. from the University of Texas.

SWIB STATE OF WISCONSIN INVESTMENT BOARD

ASSET ALLOCATION REVIEW

OCTOBER WORKSHOP

OCTOBER 16, 2024

Joe Nankof, Partner
Todd Mattina, Asset & Risk Allocation, CIO

NEPC

OUTLINE

- **Executive Summary**
- **2025 Asset Allocation Recommendations**
  - Summary
  - Capital Market Assumptions and Economic Outlook
- **Long-term Private Investment Framework**
- **Conclusions and Next Steps**
- **Appendices**

EXECUTIVE SUMMARY

- **The NEPC and ARA asset allocation recommendation* for 2025 is to increase the CTF target allocation in Private Equity/Debt by 2% of CTF and reduce the Public Equity allocation by 2%:**
  - Increase the target allocation in Private Equity/Debt to 20% from 18% of the CTF
  - Lower the target allocation in Public Equity from 40% to 38% of the CTF
- **The proposed annual asset allocation changes in the CTF Policy Portfolio follow a deliberate 10-year pacing plan to increase private market allocations over time**
  - An increase in Private Equity/Debt by 2% of CTF in 2025 is consistent with SWIB's pacing plan
- **In an analysis of the long-term private investment framework, NEPC and ARA find that the CTF will maintain sufficient liquidity in the baseline pacing plan to cover future cash flows needs**
  - Ensuring sufficient fund liquidity to cover future benefit payments, capital calls and other obligations is a critical factor in determining an appropriate long-term allocation in illiquid assets
  - Simulation analysis and stress-test scenarios indicate that the CTF will maintain sufficient liquidity with a high degree of confidence, including in stressed market conditions
- **By varying capital commitments, SWIB can maintain the CTF private market allocation in line with the pacing plan over time**
  - Commitments will also vary with market opportunities and to ensure diversification across vintage years

*The final asset allocation recommendation will be presented at the Board's December 2024 meeting.

2025 ASSET ALLOCATION RECOMMENDATIONS

CURRENT CTF POLICY AND RECOMMENDATION

Decision	Current Policy Targets	Recommended Targets
Public Markets Allocation	40% Equity 27% Fixed Income 19% TIPS	38% Equity 27% Fixed Income 19% TIPS
Private Markets Allocation	18% Private Equity & Debt 8% Real Estate	20% Private Equity & Debt 8% Real Estate
Policy Leverage	12% of CTF	No Change
Active Risk Target	120 basis points	No Change

CURRENT AND RECOMMENDED ALLOCATIONS
SUMMARY

Asset Class	10 Year Return Geometric Return	10 Year Sharpe Ratio	30 Year Return Geometric Return	30 Year Sharpe Ratio	Standard Deviation	Current Policy	Recommended Policy	Recommended Rebalance Ranges
Public Equity	5.0%	0.05	7.0%	0.19	18.0%	40%	38%	32 - 44%
Public Fixed Income	5.9%	0.28	6.1%	0.42	6.3%	27%	27%	21 - 33%
Private Equity/Debt	8.1%	0.19	9.5%	0.29	20.6%	18%	20%	12 - 28%
Real Estate	6.0%	0.12	6.5%	0.20	15.0%	8%	8%	4 - 12%
TIPS	4.8%	0.11	4.8%	0.22	6.0%	19%	19%	14 - 24%
Cash	4.2%	N/A	3.5%	N/A	0.6%	0%	0%	
Policy Leverage*	4.3%	N/A	3.7%	N/A	0.7%	-12%	-12%	-4% to -20%
Total						**100%**	**100%**	
10 Year Compound Return						6.3%	6.4%	
10 Year Sharpe Ratio						0.17	0.17	
30 Year Compound Return						7.5%	7.5%	
30 Year Sharpe Ratio						0.32	0.32	
Standard Deviation						12.5%	12.6%	
Target Active Risk**						1.2%	1.2%	

* SWIB staff are allowed to eliminate Policy Leverage, i.e., down to zero

** Active risk range of +/- 0.6%

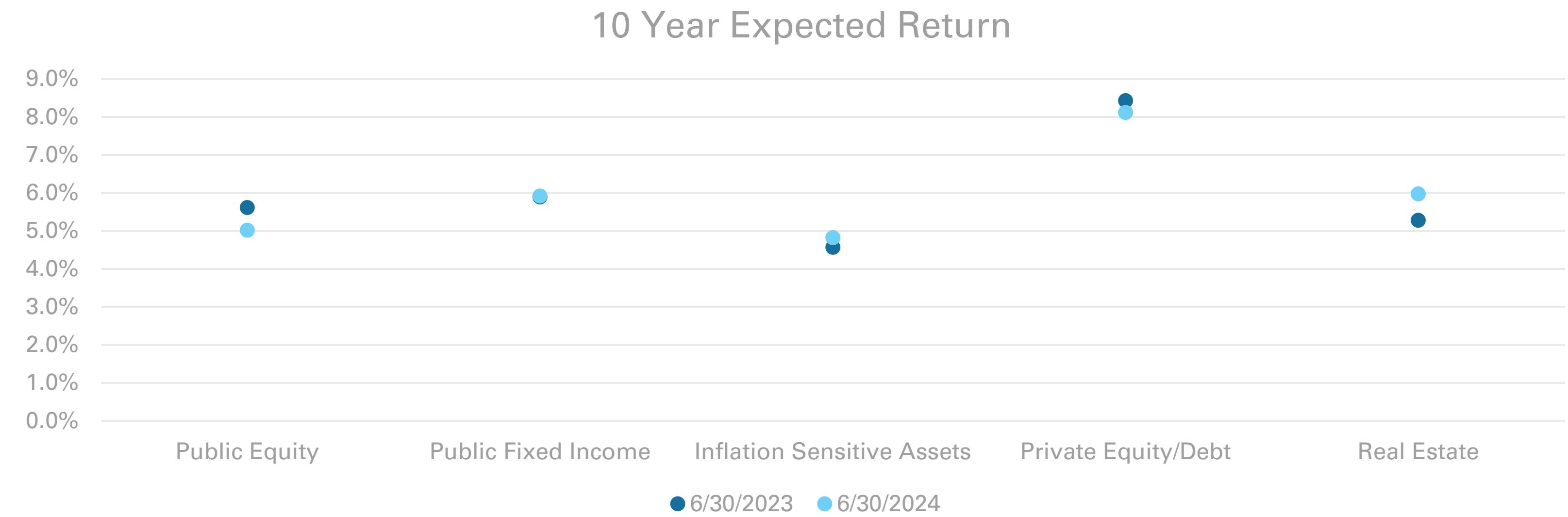
VARIABLE RETIREMENT TRUST ALLOCATION

	Current & Recommended Policy Portfolio	Rebalancing Range
US Equities	70%	65 - 75%
Int'l Equities incl. Emerging	30%	25 - 35%
10 Year Compound Return	4.9%	
30 Year Compound Return	6.9%	
Standard Deviation	18.0%	
10 Year Sharpe Ratio	0.04	
30 Year Sharpe Ratio	0.19	
Target Active Risk*	0.6%	

* Active risk range of +/- 0.3%

CAPITAL MARKET ASSUMPTIONS

2024 & 2023 ASSUMPTIONS



Sources: S&P, FactSet

ASSET CLASS ASSUMPTIONS

OVERVIEW

- **NEPC's capital market assumptions are available each quarter with this release reflecting June 30, 2024 market data**
- **Strong equity performance over the past 12 months has further stretched valuations, weighing on forward-looking returns**
- **Return-seeking credit return forecasts have fallen as tighter credit spreads offset higher interest rates**
- **Real interest rate expectations rose, reflecting the impact of a resilient economic backdrop**
- **Real asset exposure can enhance risk-adjusted returns as markets undergo a secular shift toward higher interest rates and inflation levels**

ASSET CLASS ASSUMPTIONS

DEVELOPMENT

- **Assumptions are published for over 70 asset classes**
  - NEPC publishes return forecasts for 10-year and 30-year periods
- **Market data as of 06/30/2024**
  - Assumptions are developed with NEPC valuations models and rely on a building block approach
- **The 10-year return outlook is intended to support strategic asset allocation analysis**
- **30-year return assumptions are used for actuarial inputs and long-term planning**

Asset Allocation Process

1. Finalize list of new asset classes
2. Calculate asset class volatility and correlation assumptions
3. Set model terminal values, growth, and inflation inputs
4. Model data updated at quarter-end
5. Review model outputs and produce asset class return assumptions
6. Assumptions released on the 15th calendar day after quarter-end

ASSET CLASS BUILDING BLOCKS

METHODOLOGY

- **Asset models reflect current and forecasted market data to inform expected returns**
- **Systematic inputs are paired with a long-term trend to terminal values**
- **Model inputs are aggregated to capture key return drivers for each asset class**
- **Building block inputs will differ across asset class categories**

U.S. INFLATION ASSUMPTIONS

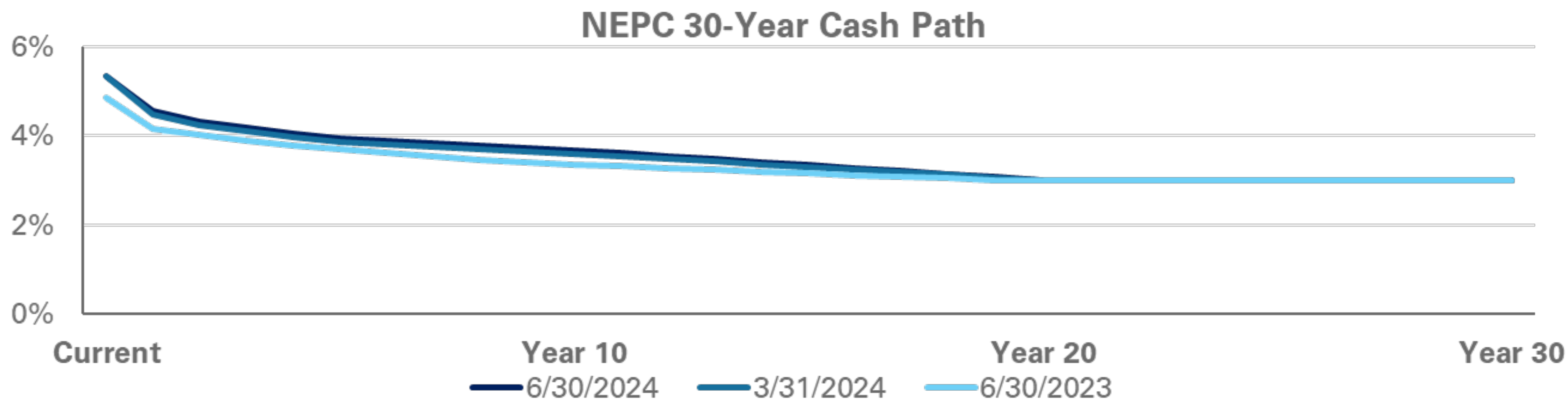
OVERVIEW

- **Inflation is a key building block to develop asset class assumptions**
- **Inflation assumptions are model-driven and informed by multiple inputs for both the U.S. and global assets**
- **NEPC's inflation assumption forecasts near-term paths for major Consumer Price Index (CPI) components including food, energy, core services, and shelter costs**
  - CPI is expected to converge with breakeven inflation forecast over the long-term
- **The composite inflation assumption reflects a blend of NEPC's inflation forecast and market-implied breakeven inflation rates**

U.S. Inflation Assumption		
Time Horizon	**Current**	**12-Month Change**
10-Year	2.6%	-0.1%
30-Year	2.6%	-0.1%

U.S. CASH

EXPECTATIONS



- **Cash is a foundational input for all asset class return expectations that reflects forward expectations of inflation and real interest rates**
  - Cash + risk premia is an input for long-term asset class return projections

- **The composite cash assumption is built from a blend of NEPC's cash forecast and market forward pricing of short-term interest rates**

Time Horizon	Current	12-Month Change
10-Year	4.2%	+0.2%
30-Year	3.5%	+0.1%

Sources: Bloomberg, FactSet, NEPC

CORE ASSET CLASS RETURN ASSUMPTIONS

	Asset Class	06/30/24 10-Year Return	06/30/23 10-Year Return	Delta
	Cash	4.2%	4.0%	+0.2%
	U.S. Inflation	2.6%	2.7%	-0.1%
Equity	U.S. Large-Cap Equity	4.0%	4.6%	-0.6%
	Non-U.S. Developed Equity	4.5%	5.0%	-0.5%
	Emerging Market Equity	7.8%	9.2%	-1.4%
	Global Equity*	5.0%	5.7%	-0.7%
	Private Equity*	8.7%	9.1%	-0.4%
Fixed Income	U.S. Treasury Bond	4.6%	4.2%	+0.4%
	U.S. Municipal Bond	3.8%	4.1%	-0.3%
	U.S. Aggregate Bond*	5.0%	4.7%	+0.3%
	U.S. TIPS	4.8%	4.6%	+0.2%
	U.S. High Yield Corporate Bond	6.3%	6.8%	-0.5%
	Private Debt*	8.3%	8.6%	-0.3%
Real Assets	Commodity Futures	4.4%	4.8%	-0.4%
	REIT	6.3%	6.4%	-0.1%
	Gold	5.0%	5.3%	-0.3%
	Real Estate - Core	6.0%	5.3%	+0.7%
	Private Real Assets - Infrastructure	6.6%	6.3%	+0.3%
Multi-Asset	60% S&P 500 & 40% U.S. Aggregate	4.7%	4.9%	-0.2%
	60% MSCI ACWI & 40% U.S. Agg.	5.3%	5.6%	-0.3%
	Hedge Fund*	6.2%	6.3%	-0.1%

*Calculated as a blend of other asset classes

CORE ASSET CLASS RETURN ASSUMPTIONS

	Asset Class	6/30/24 30-Year Return	6/30/23 30-Year Return	Delta
	Cash	3.5%	3.4%	+0.1%
	U.S. Inflation	2.6%	2.7%	-0.1%
Equity	U.S. Large-Cap Equity	6.3%	6.7%	-0.4%
Equity	Non-U.S. Developed Equity	6.1%	6.5%	-0.4%
Equity	Emerging Market Equity	9.0%	9.4%	-0.4%
Equity	Global Equity*	7.0%	7.4%	-0.4%
Equity	Private Equity*	10.0%	10.2%	-0.2%
Fixed Income	U.S. Treasury Bond	4.6%	4.1%	+0.5%
Fixed Income	U.S. Municipal Bond	4.0%	3.8%	+0.2%
Fixed Income	U.S. Aggregate Bond*	5.1%	4.7%	+0.4%
Fixed Income	U.S. TIPS	4.8%	4.4%	+0.4%
Fixed Income	U.S. High Yield Corporate Bond	7.3%	7.1%	+0.2%
Fixed Income	Private Debt*	9.0%	9.1%	-0.1%
Real Assets	Commodity Futures	3.8%	3.6%	+0.2%
Real Assets	REIT	7.4%	7.4%	—
Real Assets	Gold	4.9%	4.9%	—
Real Assets	Real Estate - Core	6.5%	5.8%	+0.4%
Real Assets	Private Real Assets - Infrastructure	7.0%	6.9%	+0.1%
Multi-Asset	60% S&P 500 & 40% U.S. Aggregate	6.1%	6.2%	-0.1%
Multi-Asset	60% MSCI ACWI & 40% U.S. Agg.	6.6%	6.6%	—
Multi-Asset	Hedge Fund*	6.5%	6.5%	—

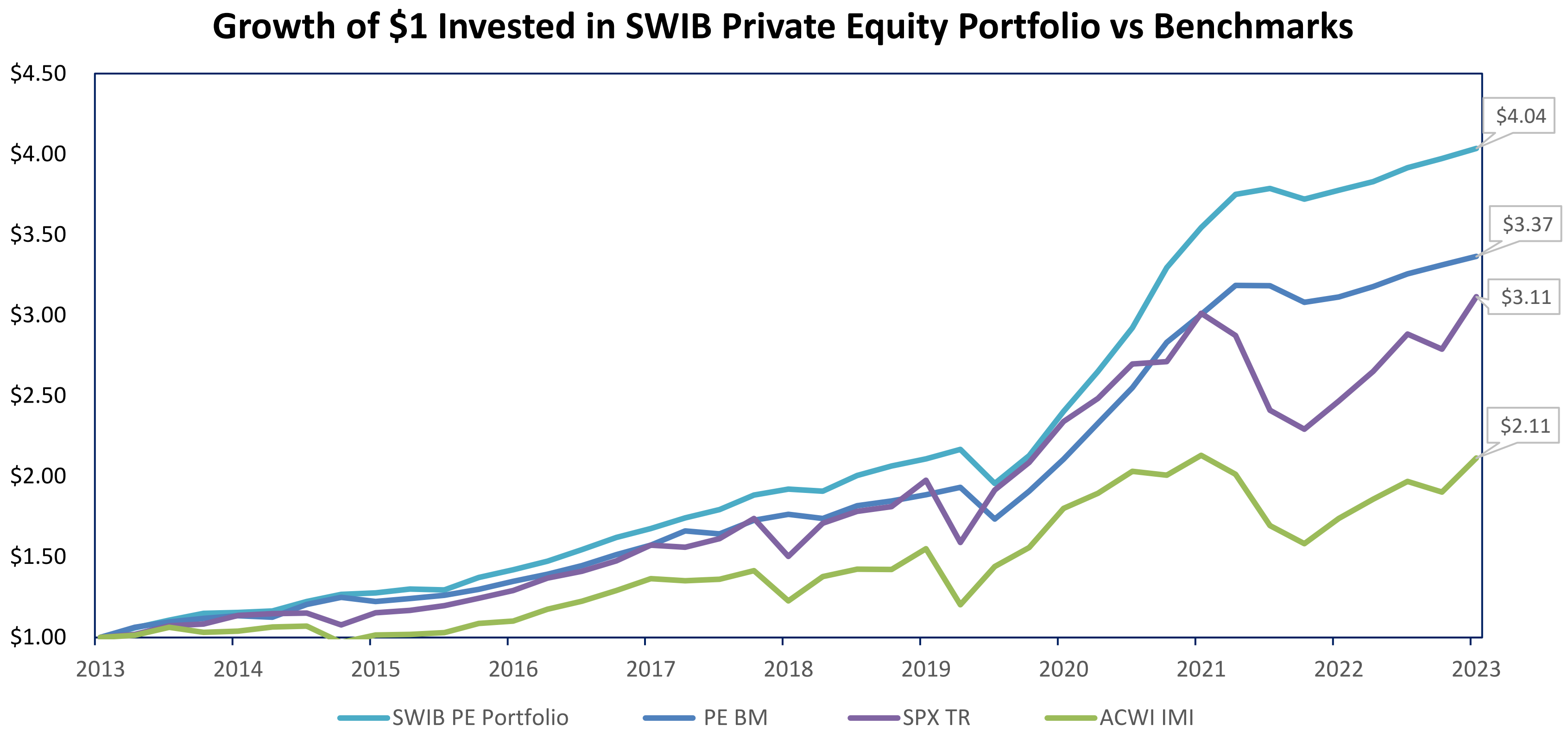
*Calculated as a blend of other asset classes

LONG-TERM PRIVATE INVESTMENT FRAMEWORK

SUMMARY

- **Private investments contribute meaningfully to CTF long-term expected returns**
  - From a policy perspective, private assets currently offer a higher long-term expected return versus similar public market assets, owing in part to the illiquidity premium
  - Private assets also enjoy fundamental opportunities to generate significant value-added over the long-term
- **Additional increases in target allocations to private investments will be considered in the context of evolving CTF liquidity needs and sensitivity to potential market stress**
  - SWIB's pacing plan for CTF policy allocations to private market investments in the next 10 years maintains significant excess liquidity relative to cashflow needs
  - Stress-test analysis also indicates that the pacing model maintains sufficient excess liquidity in the most stressful market environments (even without considering a response function that would alter commitments to adjust the private investments allocation)
- **Adjusting commitments is the primary mechanism allowing SWIB to control private market allocations over time**
  - Realizations in returns, distributions and capital calls in any given year are uncertain
  - Commitments allow staff to align the private market allocation with the pacing plan over time, even if actual allocations deviate in any given year
  - Importantly, commitments will also be guided by market opportunities and ensuring diversification across vintage years

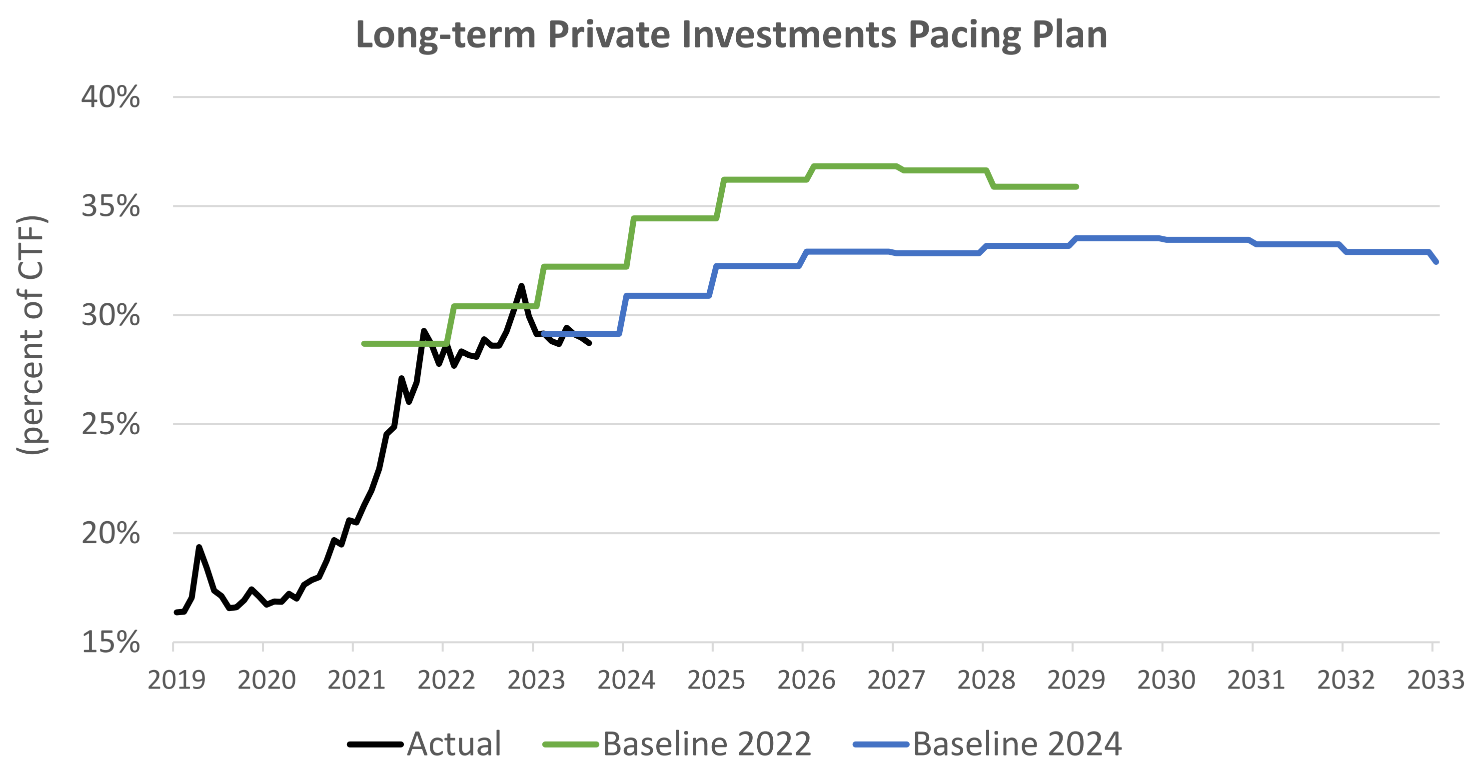
PRIVATE EQUITY HAS GENERATED SIGNIFICANT VALUE



- **For the 10 years ending 6/30/2023, SWIB's Private Equity/Debt program generated annualized net-of-fee returns of 5.7% in excess of public equity markets**
  - Private Equity outperformed the public equity market and SWIB's manager selection outperformed the broad benchmark

Source: Official Net of All SWIB returns for PE Portfolio, State Street, MSCI and FactSet

LONG-TERM PRIVATE INVESTMENTS PACING PLAN



- **The long-term pacing plan projects that the private investments allocation reaches nearly 35% over the next 10 years**

Source: Pacing model for 2022 based on SWIB projections of cashflows and returns. Pacing model for 2024 is based on SWIB cashflow projections and NEPC expected returns.

FRAMEWORK FOR ANALYZING LIQUIDITY RISK

- **CTF liquidity risk metrics**
  - Excess liquidity: liquid assets net of cash requirements as a % of CTF
  - Liquidity Coverage Ratio: sources of liquidity divided by cash requirements

- **Simulation model evaluates CTF liquidity risk in the 10-year pacing plan**
  - Simulation builds on the 2024 pacing model of expected commitments, capital calls and distributions
  - Model generates 10,000 scenarios of random public and private asset returns, producing a distribution of potential liquidity outcomes each year in the 10-year pacing plan

- **Cash flow assumptions**
  - Framework includes dynamic cash flow rules to simulate the relationship between capital calls, distributions and US large cap equity returns
  - Importantly, the simulation model does not include a commitment response rule that reflects SWIB's reaction to deviations from the pacing plan. The commitment response is evaluated in a separate stress-test.

LIQUIDITY PROFILE OF THE LONG-TERM PRIVATE INVESTMENT ALLOCATION

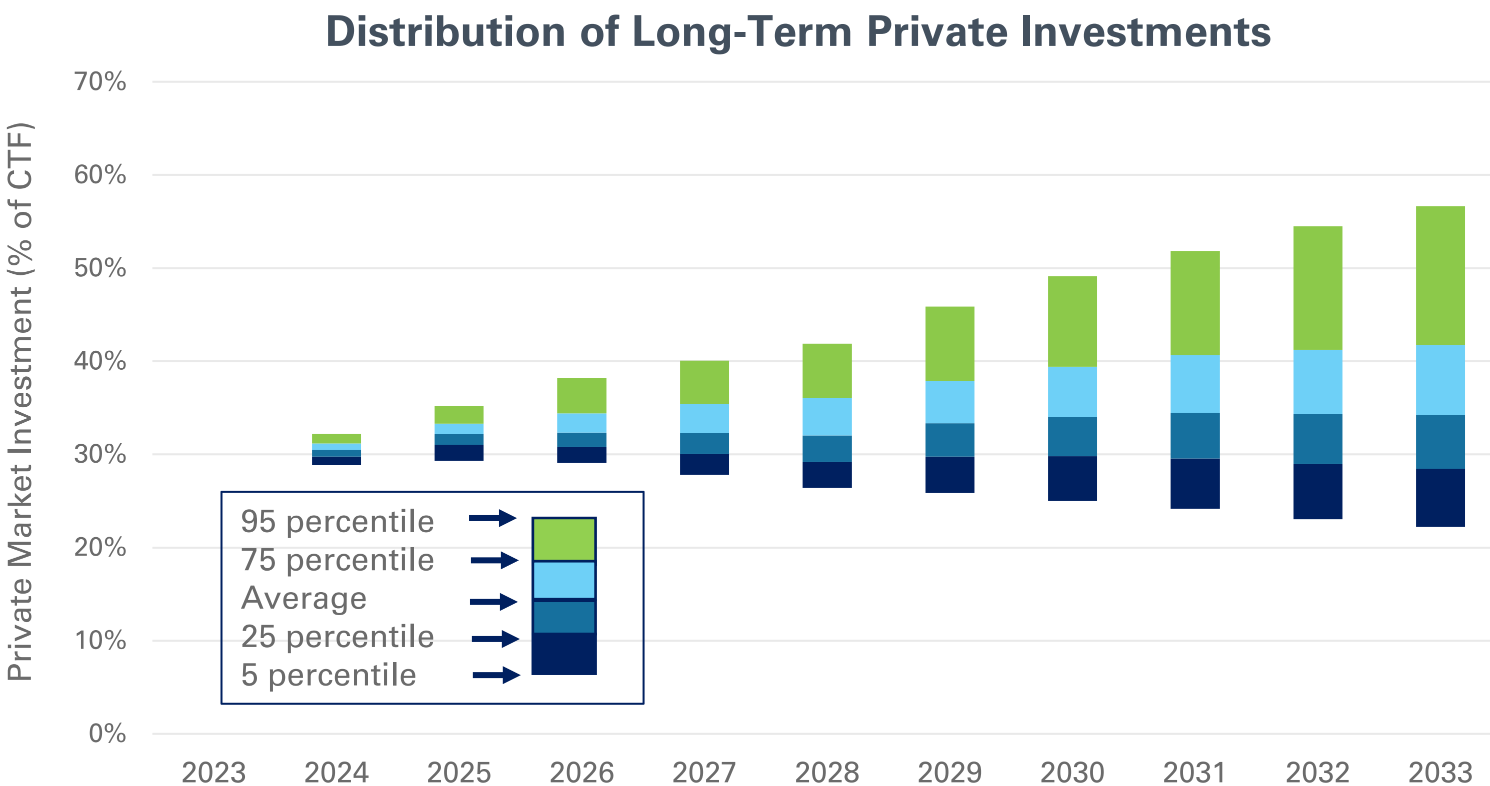
	Private Allocation in Year 10 of Simulation (% of CTF)			Excess Liquidity in Year 10 of Simulation (% of CTF)			Liquidity Coverage Ratio (LCR) in Year 10 of Simulation (1-year LCR)		
	Avg	75% CL	95% CL	Avg	25% CL	5% CL	Avg	25% CL	5% CL
SWIB Pacing Plan*	34	42	58	28	23	12	4.1	3.1	1.8

*Based on the expected private investments allocation in Year 10 of the pacing plan.

Note: "CL" represents the statistical Confidence Level. For example, the column heading "95% CL" implies that the expected outcome is in the range 95% of the time and outside the range 5% of the time.

SIMULATION OF PRIVATE ALLOCATIONS (% OF CTF)

RANGE OF POTENTIAL OUTCOMES BY YEAR



- In the first five years, the high end of the range for private market investments as a percent of CTF is approximately 40%
- In years 6-10, the allocation at the high end of the range can exceed 50% of CTF

Source: Bloomberg, FactSet

CURRENT CTF LIQUIDITY NEEDS AND COVERAGE

- **2024 CTF net liquidity (cash) needs on a full-year basis are estimated below:**

Uses		Sources		
$7.2B Benefit Payments + $5.0B Capital Calls (Illiquid Assets)	-	$2.5B Contributions + $4.0B Distributions (Illiquid Assets)	=	$5.7B Net Cash Needs

- **CTF Net Excess Liquidity can be defined as follows:**

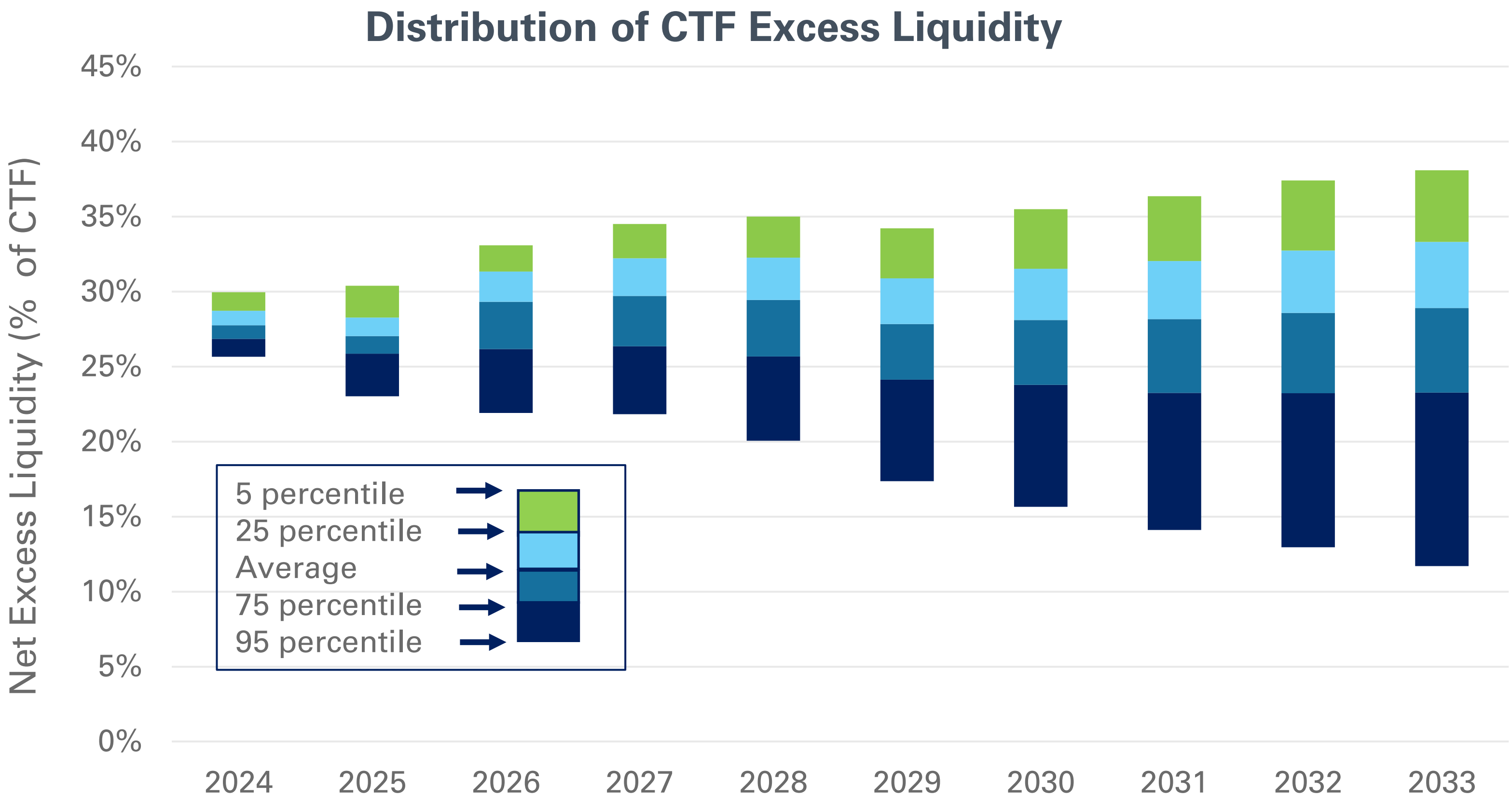
Liquid Financial Assets*				
$22.7B Large Cap Stocks $4.6B Treasuries $14.1B TIPS	-	$5.7B Net Cash Needs	=	$35.7B Net Excess Liquidity (29% of CTF)

- **Net excess liquidity incorporates the following:**
  - Adjusted for encumbered assets linked to leverage sourcing
  - Includes distributions at 1-year horizon, but it is also estimated at the monthly and quarterly horizons assuming no distributions

*The amount of Liquid Financial Assets available to meet liquidity needs is adjusted for leverage.

SIMULATION OF EXCESS LIQUIDITY (% OF CTF)

RANGE OF POTENTIAL OUTCOMES BY YEAR



- In the first five years, the low end of the range for excess liquidity is roughly 20% of CTF
- In years 6-10, the excess liquidity only drops below 15% of CTF in extreme scenarios

Source: Bloomberg, FactSet

DEFINING THE LIQUIDITY COVERAGE RATIO (LCR)

- **Liquidity coverage can be expressed as a ratio by rearranging Liquid Financial Assets and Cashflow Sources and Uses.**
  - The Liquidity Coverage Ratio (LCR) at a 1-year horizon can be interpreted as years of available liquidity coverage

Numerator:

Liquid Financial Assets*
Large Cap DM Stocks
U.S. Treasuries
TIPS
$41.4B

\+

Sources
Employer & Employee Contributions
$2.5B

\+

Sources
Distributions (Illiquid Assets)
$4.0B

Denominator:

Uses
Benefit Payments
$7.2B

\+

Uses
Capital Calls (Illiquid Assets)
$5.0B

=

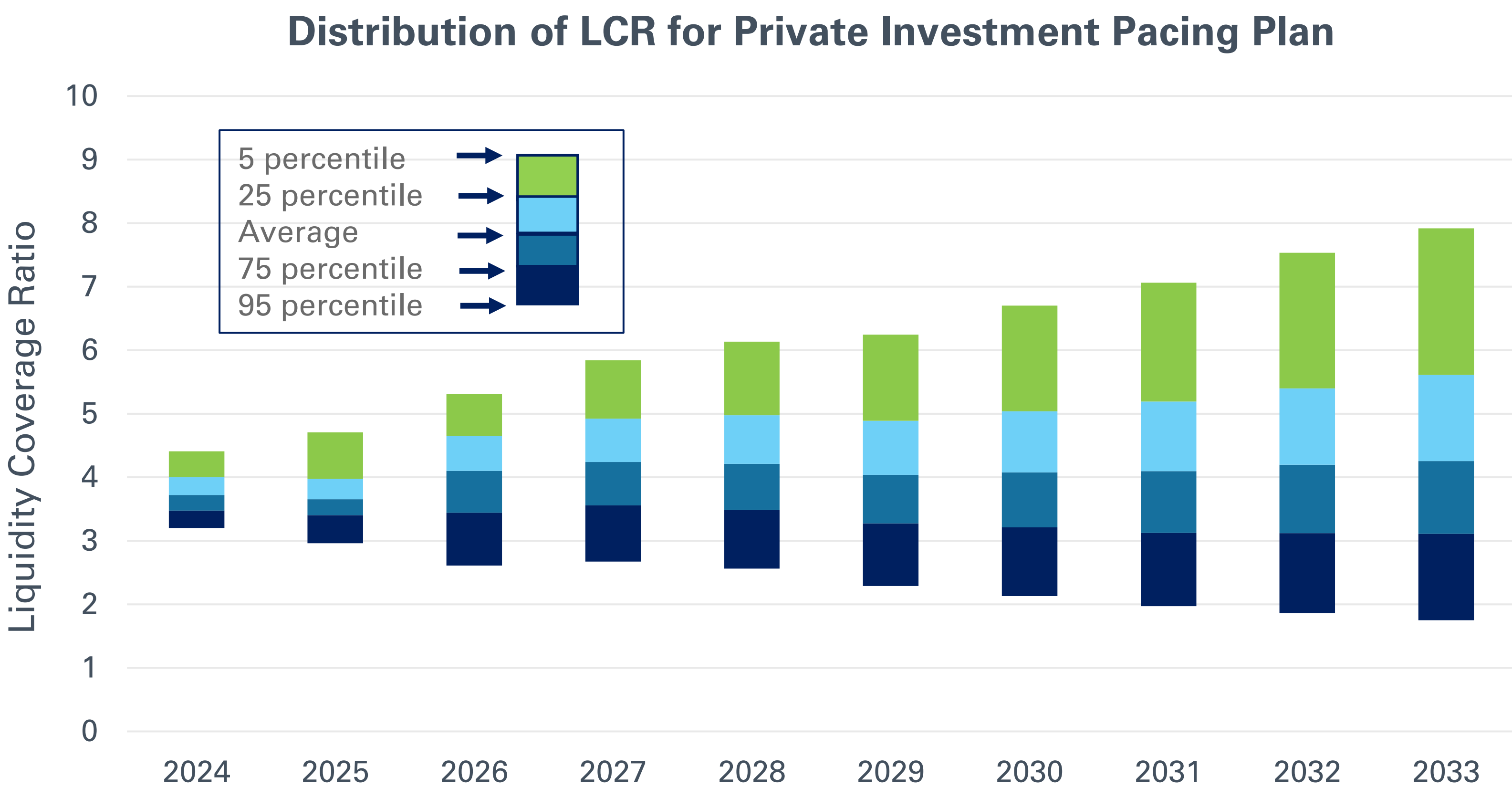
Liquidity Coverage Ratio: 3.9 years

- **The LCR can also be expressed at a monthly or quarterly horizon.**
  - Evaluating liquidity coverage at different horizons helps to identify potential vulnerabilities to different market scenarios (sharp market downturn and reversal versus a drawn-out market decline)

*The amount of Liquid Financial Assets available to meet liquidity needs is adjusted for leverage.

SIMULATION OF LIQUIDITY COVERAGE RATIO (LCR)

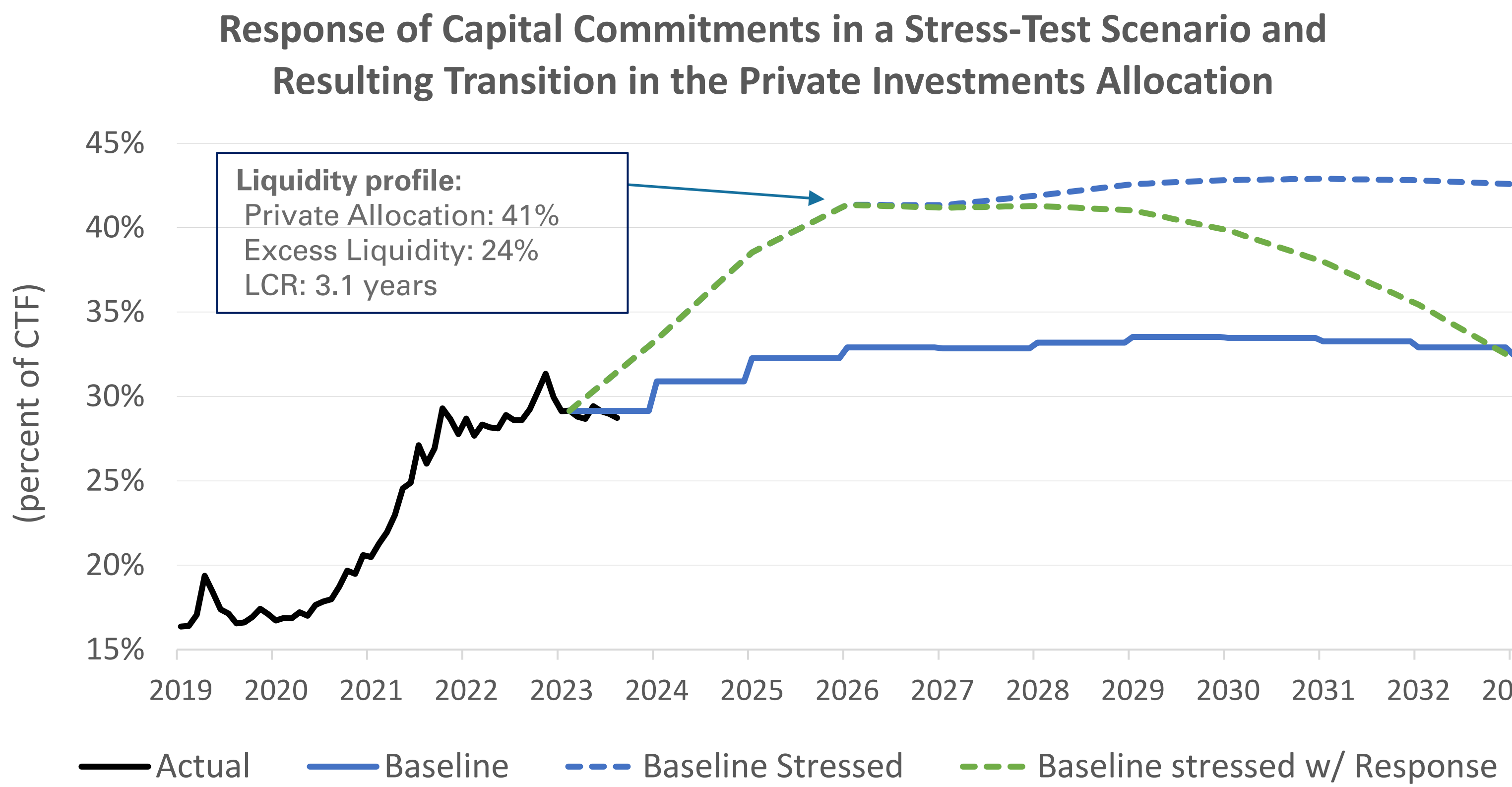
RANGE OF POTENTIAL OUTCOMES BY YEAR



- In the first five years, the low end of the range for LCR is roughly 2.5
- In years 6-10, LCR only drops below 2.0 in extreme scenarios

Source: Bloomberg, FactSet

STRESSED BASELINE SCENARIO & RESPONSE RULE



Annual Commitment Amounts ($mils)	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Long-term Plan	5,680	5,858	6,207	6,262	6,317	6,317	6,317	6,317	6,317	6,317
Long-Term Plan stressed w/ Response	5,680	5,858	6,207	5,737	5,792	5,792	5,792	5,792	5,792	5,792

Stress test assumes Public Equity returns of -15% in years 1 to 3 and NEPC expected returns for other policy assets. Public Equity returns revert to NEPC assumed returns in years 4 to 10. Pacing model reflects SWIB cashflow projections.

CONCLUSIONS AND NEXT STEPS

CONCLUSIONS AND NEXT STEPS

- **Private market assets enhance the CTF's long-term expected returns**
  - Private market assets, such as private equity, offer a significant expected premium over similar public market assets
  - Fundamental opportunities in private market investing also allow managers to add value over the long term
- **Commitments are the primary tool for SWIB to control the pacing of private market allocations over time**
  - Returns, distributions and capital calls are uncertain in any given year
  - Commitments of new capital allow SWIB to stay on-track with a deliberate pacing model over the long term even if there are deviations in any given year
- **Higher policy allocations to private markets will be considered in the context of CTF liquidity**
  - Projected CTF policy allocations indicate significant excess liquidity relative to projected liquidity needs in Monte Carlo simulations
- **NEPC and ARA will present the 2025 asset allocation recommendation to the Board at the December meeting for approval**

APPENDIX 1:

PUBLIC EQUITY AND FIXED INCOME STRUCTURE

REFERENCE PORTFOLIO ATTRIBUTION

PUBLIC EQUITY STRUCTURE

	Current Equity Allocation*
Global Equities	78.9%
US Small Cap Equities	7.8%
Int'l Small Cap Equities	3.6%
Emerging Market Large Cap	
China	1.2%
x-China	6.9%
Emerging Market Small Cap	1.6%
Total	
10 Year Compound Return	5.0%
30 Year Compound Return	7.0%
Standard Deviation	18.0%
10 Year Sharpe Ratio	0.05
30 Year Sharpe Ratio	0.19

* Market capitalization weights as of June 30, 2024; Actual market capitalization weights will float with market moves over time. Provided for informational purposes.

PUBLIC FIXED INCOME STRUCTURE

	Current Fixed Income Allocation	Recommnded Fixed Income Allocation
US Treasuries	24.0%	24.0%
US Investment Grade Credit	24.0%	24.0%
Mortgage-Backed	8.0%	8.0%
Long Treasuries	4.0%	4.0%
High Yield Bonds	20.0%	20.0%
Leveraged Loans	10.0%	10.0%
Emerging Market Debt*	10.0%	10.0%
Total		
10 Year Compound Return	5.9%	5.9%
30 Year Compound Return	6.1%	6.1%
Standard Deviation	6.3%	6.3%
10 Year Sharpe Ratio	0.28	0.28
30 Year Sharpe Ratio	0.42	0.42

*Blended 50% / 50% external and local.

REFERENCE PORTFOLIO ATTRIBUTION

	10 Year Expected Return	Standard Deviation	30 Year Expected Return
Reference Portfolio	5.34%	11.40%	6.56%
Private Markets	0.69%	0.21%	0.55%
Portfolio Structure	0.14%	0.31%	0.14%
Leverage	0.18%	0.66%	0.29%
Recommended Portfolio	6.35%	12.58%	7.54%

APPENDIX 2:

CAPITAL MARKETS ASSUMPTIONS

PUBLIC EQUITY ASSUMPTIONS

BUILDING BLOCKS

Illiquidity Premium	The return expected for assets with illiquidity risk
Valuation	Represents P/E multiple contraction or expansion relative to long-term trend
Inflation	Market-specific inflation based on country-level revenue exposure
Real Earnings Growth	Market-specific real growth based on a weighted-average of country revenue exposure and GDP growth
Dividend Yield	Income distributed to shareholders adjusted to reflect market trends

Asset Class	06/30/24 10-Yr Return	12-Month Change
U.S. Large-Cap Equity	4.0%	-0.6%
U.S. Small/Mid-Cap Equity	6.2%	-0.3%
Non-U.S. Developed Equity	4.5%	-0.5%
Non-U.S. Developed Small-Cap Equity	6.7%	-0.6%
Emerging Market Equity	7.8%	-1.4%
Emerging Market Small-Cap Equity	7.1%	-1.5%
China Equity	9.8%	-0.1%
Hedge Fund - Equity	5.5%	-0.2%
Global Equity*	5.0%	-0.7%
Private Equity*	8.7%	-0.4%

Source: NEPC
*Calculated as a blend of other asset classes

FIXED INCOME ASSUMPTIONS

BUILDING BLOCKS

Illiquidity Premium	The return expected for assets with illiquidity risk
Government Rates Price Change	Change due to shifts in current yields relative to forecasted rates
Credit Deterioration	The average loss for credit assets due to defaults and recovery rates
Spread Price Change	Valuation change due to changes in credit spreads relative to long-term targets
Credit Spread	Yield premium provided by securities with credit risk
Government Rates	The yield attributed to sovereign bonds that do not have credit risk

Asset Class	06/30/24 10-Yr Return	12-Month Change
U.S. TIPS	4.8%	+0.2%
U.S. Treasury Bond	4.6%	+0.4%
U.S. Corporate Bond	5.7%	-
U.S. MBS	4.8%	+0.3%
U.S. High Yield Corporate	6.3%	-0.5%
U.S. Leveraged Loan	7.4%	-0.2%
EMD External Debt*	7.7%	-
EMD Local Currency Debt	6.9%	+0.4%
Non-U.S. Govt. Bond	2.7%	+0.1%
U.S. Muni Bond (1-10 Year)	3.4%	+0.2%
U.S. High Yield Muni Bond	4.2%	-1.6%
Hedge Fund – Credit	6.7%	-0.2%
U.S. Aggregate Bond*	5.0%	+0.3%
Private Debt*	8.3%	-0.3%

Source: NEPC
*Calculated as a blend of other asset classes

REAL ASSET ASSUMPTIONS
BUILDING BLOCKS

Illiquidity Premium	The return expected for assets with illiquidity risk
Valuation	The change in price of the asset moving to a terminal value or real average level
Inflation	Based on the inflation path as defined by breakeven-inflation rates and NEPC assumptions
Growth	Market-specific real growth based on a weighted-average of country-level revenue exposure and GDP growth
Real Income	The inflation-adjusted income produced by the asset

Asset Class	06/30/24 10-Yr Return	12-Month Change
Commodity Futures	4.4%	-0.4%
Midstream Energy	5.0%	-1.0%
REIT	6.3%	-0.1%
Global Infrastructure Equity	6.2%	+0.3%
Global Natural Resources Equity	6.4%	-0.4%
Gold	5.0%	-0.3%
Real Estate - Core	6.0%	+0.7%
Real Estate – Non-Core	7.8%	+1.1%
Private Debt - Real Estate	6.6%	+0.3%
Private Real Assets - Natural Resources	8.1%	-0.4%
Private Real Assets - Infrastructure	6.6%	+0.3%

Source: NEPC
*Calculated as a blend of other asset classes

10-YEAR RETURN FORECASTS

EQUITY

Geometric Expected Return			
Asset Class	**06/30/2024**	**06/30/2023**	**Delta**
U.S. Large-Cap Equity	4.0%	4.6%	-0.6%
U.S. Small/Mid-Cap Equity	6.2%	6.5%	-0.3%
Non-U.S. Developed Equity	4.5%	5.0%	-0.5%
Non-U.S. Developed Equity (USD Hedge)	4.7%	5.1%	-0.4%
Non-U.S. Developed Small-Cap Equity	6.7%	7.3%	-0.6%
Emerging Market Equity	7.8%	9.2%	-1.4%
Emerging Market Small-Cap Equity	7.1%	8.6%	-1.5%
Hedge Fund - Equity	5.5%	5.7%	-0.2%
Private Equity - Buyout	7.2%	7.5%	-0.3%
Private Equity - Growth	8.5%	8.8%	-0.3%
Private Equity - Early Stage Venture	9.7%	10.0%	-0.3%
Private Equity - Secondary	6.7%	7.0%	-0.3%
Non-U.S. Private Equity	9.7%	10.7%	-1.0%
China Equity	9.8%	9.9%	-0.1%
Global Equity*	5.0%	5.7%	-0.7%
Private Equity*	8.7%	9.1%	-0.4%

*Calculated as a blend of other asset classes

10-YEAR RETURN FORECASTS

FIXED INCOME

Geometric Expected Return			
Asset Class	**06/30/2024**	**06/30/2023**	**Delta**
Cash	4.2%	4.0%	+0.2%
US TIPS	4.8%	4.6%	+0.2%
US Treasury Bond	4.6%	4.2%	+0.4%
US Corporate Bond	5.7%	5.7%	-
US Corporate Bond - AAA	4.9%	4.7%	+0.2%
US Corporate Bond - AA	5.1%	4.9%	+0.2%
US Corporate Bond - A	5.5%	5.5%	-
US Corporate Bond - BBB	6.0%	6.1%	-0.1%
US Mortgage-Backed Securities	4.8%	4.5%	+0.3%
US Securitized Bond	5.4%	5.3%	+0.1%
US Collateralized Loan Obligation	5.7%	5.8%	-0.1%
US Municipal Bond	3.8%	4.1%	-0.3%
US Municipal Bond (1-10 Year)	3.4%	3.2%	+0.2%
US Taxable Municipal Bond	5.5%	5.3%	+0.2%

10-YEAR RETURN FORECASTS

FIXED INCOME

Geometric Expected Return			
Asset Class	**06/30/2024**	**06/30/2023**	**Delta**
Non-US Government Bond	2.7%	2.6%	+0.1%
Non-US Government Bond (USD Hedge)	3.0%	2.8%	+0.2%
Non-US Inflation-Linked Bond (USD Hedge)	3.7%	3.8%	-0.1%
US Short-Term TIPS (1-3 Year)	4.8%	4.6%	+0.2%
US Short-Term Treasury Bond (1-3 Year)	4.7%	4.3%	+0.4%
US Short-Term Corporate Bond (1-3 Year)	5.6%	5.4%	+0.2%
US Intermediate-Term TIPS (3-10 Year)	4.8%	4.6%	+0.2%
US Intermediate-Term Treasury Bond (3-10 Year)	4.6%	4.3%	+0.3%
US Intermediate-Term Corporate Bond (3-10 Year)	6.0%	6.0%	-
US Long-Term TIPS (10-30 Year)	4.9%	4.5%	+0.4%
US Long-Term Treasury Bond (10-30 Year)	4.3%	3.9%	+0.4%
US Long-Term Corporate Bond (10-30 Year)	5.4%	5.6%	-0.2%
20+ Year US Treasury STRIPS	4.2%	3.8%	+0.4%
10 Year US Treasury Bond	4.7%	4.0%	+0.7%
10 Year Non-US Government Bond (USD Hedge)	2.6%	2.1%	+0.5%
US Aggregate Bond*	5.0%	4.7%	+0.3%

*Calculated as a blend of other asset classes

10-YEAR RETURN FORECASTS

FIXED INCOME

Geometric Expected Return			
Asset Class	**06/30/2024**	**06/30/2023**	**Delta**
US High Yield Corporate Bond	6.3%	6.8%	-0.5%
US Corporate Bond - BB	6.9%	7.5%	-0.6%
US Corporate Bond - B	6.4%	6.9%	-0.5%
US Corporate Bond - CCC/Below	0.8%	2.0%	-1.2%
US Short-Term High Yield Corporate Bond (1-3 Year)	5.8%	5.9%	-0.1%
US Leveraged Loan	7.4%	7.6%	-0.2%
Emerging Market Investment Grade External Debt	5.4%	-	-
Emerging Market High Yield External Debt	9.7%	-	-
Emerging Market Local Currency Debt	6.9%	6.5%	+0.4%
US High Yield Securitized Bond	9.3%	8.9%	+0.4%
US High Yield Collateralized Loan Obligation	8.0%	8.5%	-0.5%
US High Yield Municipal Bond	4.2%	5.8%	-1.6%
Hedge Fund - Credit	6.7%	6.9%	-0.2%
Private Debt - Credit Opportunities	7.7%	8.0%	-0.3%
Private Debt - Distressed	8.5%	8.8%	-0.3%
Private Debt - Direct Lending	8.3%	8.6%	-0.3%
Private Debt*	8.3%	8.6%	-0.3%

*Calculated as a blend of other asset classes

10-YEAR RETURN FORECASTS

REAL ASSETS

Geometric Expected Return			
Asset Class	**06/30/2024**	**06/30/2023**	**Delta**
Commodity Futures	4.4%	4.8%	-0.4%
Midstream Energy	5.0%	6.0%	-1.0%
REIT	6.3%	6.4%	-0.1%
Global Infrastructure Equity	6.2%	5.9%	+0.3%
Global Natural Resources Equity	6.4%	6.8%	-0.4%
Gold	5.0%	5.3%	-0.3%
Real Estate - Core	6.0%	5.3%	+0.7%
Real Estate – Value-Add	7.2%	6.7%	+0.5%
Real Estate - Opportunistic	8.3%	8.2%	+0.1%
Private Debt - Real Estate	6.6%	6.3%	+0.3%
Private Real Assets - Natural Resources	8.1%	8.5%	-0.4%
Private Real Assets - Infrastructure	6.6%	6.3%	+0.3%

30-YEAR RETURN FORECASTS

EQUITY

Geometric Expected Return			
Asset Class	**06/30/2024**	**06/30/2023**	**Delta**
U.S. Large-Cap Equity	6.3%	6.7%	-0.4%
U.S. Small/Mid-Cap Equity	7.5%	7.5%	-
Non-U.S. Developed Equity	6.1%	6.5%	-0.4%
Non-U.S. Developed Equity (USD Hedge)	6.4%	6.7%	-0.3%
Non-U.S. Developed Small-Cap Equity	7.9%	7.8%	+0.1%
Emerging Market Equity	9.0%	9.4%	-0.4%
Emerging Market Small-Cap Equity	8.5%	9.3%	-0.8%
Hedge Fund - Equity	6.0%	6.1%	-0.1%
Private Equity - Buyout	8.7%	8.8%	-0.1%
Private Equity - Growth	9.7%	9.8%	-0.1%
Private Equity - Early Stage Venture	10.5%	10.6%	-0.1%
Private Equity - Secondary	8.2%	8.3%	-0.1%
Non-U.S. Private Equity	10.6%	10.9%	-0.3%
China Equity	9.5%	9.5%	-
Global Equity*	7.0%	7.4%	-0.4%
Private Equity*	10.0%	10.2%	-0.2%

*Calculated as a blend of other asset classes

30-YEAR RETURN FORECASTS

FIXED INCOME

Geometric Expected Return			
Asset Class	**06/30/2024**	**06/30/2023**	**Delta**
Cash	3.5%	3.4%	+0.1%
US TIPS	4.8%	4.4%	+0.4%
US Treasury Bond	4.6%	4.1%	+0.5%
US Corporate Bond	6.1%	5.8%	+0.3%
US Corporate Bond - AAA	5.4%	5.0%	+0.4%
US Corporate Bond - AA	5.4%	4.9%	+0.5%
US Corporate Bond - A	5.8%	5.4%	+0.4%
US Corporate Bond - BBB	6.4%	6.0%	+0.4%
US Mortgage-Backed Securities	4.8%	4.3%	+0.5%
US Securitized Bond	5.5%	5.1%	+0.4%
US Collateralized Loan Obligation	5.1%	5.1%	-
US Municipal Bond	4.0%	3.8%	+0.2%
US Municipal Bond (1-10 Year)	3.7%	3.4%	+0.3%
US Taxable Municipal Bond	6.2%	5.8%	+0.4%

30-YEAR RETURN FORECASTS

FIXED INCOME

Geometric Expected Return			
Asset Class	**06/30/2024**	**06/30/2023**	**Delta**
Non-US Government Bond	3.2%	3.1%	+0.1%
Non-US Government Bond (USD Hedge)	3.4%	3.3%	+0.1%
Non-US Inflation-Linked Bond (USD Hedge)	3.7%	3.7%	-
US Short-Term TIPS (1-3 Year)	4.5%	3.9%	+0.6%
US Short-Term Treasury Bond (1-3 Year)	4.4%	3.8%	+0.6%
US Short-Term Corporate Bond (1-3 Year)	5.4%	4.9%	+0.5%
US Intermediate-Term TIPS (3-10 Year)	4.8%	4.4%	+0.4%
US Intermediate-Term Treasury Bond (3-10 Year)	4.6%	4.2%	+0.4%
US Intermediate-Term Corporate Bond (3-10 Year)	6.3%	5.9%	+0.4%
US Long-Term TIPS (10-30 Year)	5.1%	4.6%	+0.5%
US Long-Term Treasury Bond (10-30 Year)	4.7%	4.2%	+0.5%
US Long-Term Corporate Bond (10-30 Year)	6.3%	6.0%	+0.3%
20+ Year US Treasury STRIPS	4.7%	4.2%	+0.5%
10 Year US Treasury Bond	5.1%	4.0%	+1.1%
10 Year Non-US Government Bond (USD Hedge)	3.3%	3.0%	+0.3%
US Aggregate Bond*	5.1%	4.7%	+0.4%

*Calculated as a blend of other asset classes

30-YEAR RETURN FORECASTS

FIXED INCOME

Geometric Expected Return			
Asset Class	**06/30/2024**	**06/30/2023**	**Delta**
US High Yield Corporate Bond	7.3%	7.1%	+0.2%
US Corporate Bond - BB	7.6%	7.7%	-0.1%
US Corporate Bond - B	7.1%	7.0%	+0.1%
US Corporate Bond - CCC/Below	1.5%	1.8%	-0.3%
US Short-Term High Yield Corporate Bond (1-3 Year)	5.9%	5.4%	+0.5%
US Leveraged Loan	6.7%	6.8%	-0.1%
Emerging Market Investment Grade External Debt	6.1%	-	-
Emerging Market High Yield External Debt	8.7%	-	-
Emerging Market Local Currency Debt	5.9%	5.7%	+0.2%
US High Yield Securitized Bond	8.6%	8.1%	+0.5%
US High Yield Collateralized Loan Obligation	7.4%	7.7%	-0.3%
US High Yield Municipal Bond	4.9%	5.7%	-0.8%
Hedge Fund - Credit	7.1%	7.0%	+0.1%
Private Debt - Credit Opportunities	8.4%	8.4%	-
Private Debt - Distressed	9.4%	9.3%	+0.1%
Private Debt - Direct Lending	8.9%	9.0%	-0.1%
Private Debt*	9.0%	9.1%	-0.1%

*Calculated as a blend of other asset classes

30-YEAR RETURN FORECASTS

REAL ASSETS

Geometric Expected Return			
Asset Class	**06/30/2024**	**06/30/2023**	**Delta**
Commodity Futures	3.8%	3.6%	+0.2%
Midstream Energy	6.4%	6.8%	-0.4%
REIT	7.4%	7.4%	-
Global Infrastructure Equity	6.8%	6.7%	+0.1%
Global Natural Resources Equity	7.2%	7.2%	-
Gold	4.9%	4.9%	-
Real Estate - Core	6.5%	5.8%	+0.7%
Real Estate – Value-Add	7.8%	7.5%	+0.3%
Real Estate - Opportunistic	8.7%	9.0%	-0.3%
Private Debt - Real Estate	6.8%	6.3%	+0.5%
Private Real Assets - Natural Resources	8.9%	8.8%	+0.1%
Private Real Assets - Infrastructure	7.0%	6.9%	+0.1%

VOLATILITY FORECASTS

EQUITY

Volatility			
Asset Class	**12/31/2023**	**12/31/2022**	**Delta**
U.S. Large-Cap Equity	17.2%	16.9%	+0.3%
U.S. Small/Mid-Cap Equity	21.0%	20.8%	+0.2%
Non-U.S. Developed Equity	19.7%	19.6%	+0.1%
Non-U.S. Developed Equity (USD Hedge)	17.7%	17.6%	+0.1%
Non-U.S. Developed Small-Cap Equity	24.2%	24.2%	-
Emerging Market Equity	28.1%	28.6%	-0.5%
Emerging Market Small-Cap Equity	31.4%	31.9%	-0.5%
Hedge Fund - Equity	11.0%	11.1%	-0.1%
Private Equity - Buyout	20.0%	20.0%	-
Private Equity - Growth	31.5%	31.4%	+0.1%
Private Equity - Early Stage Venture	46.5%	45.0%	+1.5%
Private Equity - Secondary	20.4%	21.0%	-0.6%
Non-U.S. Private Equity	32.0%	32.0%	-
China Equity	30.6%	30.7%	-0.1%
Global Equity*	18.2%	18.1%	+0.1%
Private Equity*	25.9%	25.7%	+0.2%

*Calculated as a blend of other asset classes

VOLATILITY FORECASTS

FIXED INCOME

Volatility			
Asset Class	12/31/2023	12/31/2022	Delta
Cash	0.6%	0.6%	-
US TIPS	6.0%	6.1%	-0.1%
US Treasury Bond	5.4%	5.4%	-
US Corporate Bond	7.7%	7.6%	+0.1%
US Corporate Bond - AAA	6.8%	6.5%	+0.3%
US Corporate Bond - AA	6.6%	6.4%	+0.2%
US Corporate Bond - A	7.6%	7.5%	+0.1%
US Corporate Bond - BBB	8.4%	8.4%	-
US Mortgage-Backed Securities	6.5%	6.5%	-
US Securitized Bond	8.0%	8.2%	-0.2%
US Collateralized Loan Obligation	7.7%	7.6%	+0.1%
US Municipal Bond	6.0%	6.0%	-
US Municipal Bond (1-10 Year)	4.5%	4.5%	-
US Taxable Municipal Bond	7.5%	7.5%	-

VOLATILITY FORECASTS
FIXED INCOME

Volatility			
Asset Class	**12/31/2023**	**12/31/2022**	**Delta**
Non-US Government Bond	9.5%	9.5%	-
Non-US Government Bond (USD Hedge)	4.1%	4.1%	-
Non-US Inflation-Linked Bond (USD Hedge)	6.7%	6.6%	+0.1%
US Short-Term TIPS (1-3 Year)	3.3%	3.4%	-0.1%
US Short-Term Treasury Bond (1-3 Year)	2.3%	2.3%	-
US Short-Term Corporate Bond (1-3 Year)	2.8%	2.8%	-
US Intermediate-Term TIPS (3-10 Year)	6.0%	6.0%	-
US Intermediate-Term Treasury Bond (3-10 Year)	5.9%	5.9%	-
US Intermediate-Term Corporate Bond (3-10 Year)	7.1%	7.1%	-
US Long-Term TIPS (10-30 Year)	12.4%	12.4%	-
US Long-Term Treasury Bond (10-30 Year)	11.8%	11.8%	-
US Long-Term Corporate Bond (10-30 Year)	11.9%	12.1%	-0.2%
20+ Year US Treasury STRIPS	20.7%	20.7%	-
10 Year US Treasury Bond	7.5%	7.5%	-
10 Year Non-US Government Bond (USD Hedge)	5.0%	5.1%	-0.1%
US Aggregate Bond*	5.8%	5.8%	-

*Calculated as a blend of other asset classes

VOLATILITY FORECASTS

FIXED INCOME

Volatility			
Asset Class	**12/31/2023**	**12/31/2022**	**Delta**
US High Yield Corporate Bond	11.2%	11.1%	+0.1%
US Corporate Bond - BB	9.7%	9.7%	-
US Corporate Bond - B	11.6%	11.7%	-0.1%
US Corporate Bond - CCC/Below	20.3%	20.3%	-
US Short-Term High Yield Corporate Bond (1-3 Year)	8.2%	8.5%	-0.3%
US Leveraged Loan	9.1%	9.1%	-
Emerging Market Investment Grade External Debt	8.7%	-	-
Emerging Market High Yield External Debt	17.5%	-	-
Emerging Market Local Currency Debt	12.7%	13.0%	-0.3%
US High Yield Securitized Bond	11.2%	11.1%	+0.1%
US High Yield Collateralized Loan Obligation	10.4%	10.4%	-
US High Yield Municipal Bond	12.0%	12.0%	-
Hedge Fund - Credit	9.9%	10.0%	-0.1%
Private Debt - Credit Opportunities	14.5%	14.8%	-0.3%
Private Debt - Distressed	14.4%	14.6%	-0.2%
Private Debt - Direct Lending	11.0%	11.0%	-
Private Debt*	11.8%	11.8%	-

*Calculated as a blend of other asset classes

VOLATILITY FORECASTS

REAL ASSETS

Volatility			
Asset Class	**12/31/2023**	**12/31/2022**	**Delta**
Commodity Futures	18.5%	18.5%	-
Midstream Energy	28.2%	28.8%	-0.6%
REIT	21.8%	21.7%	+0.1%
Global Infrastructure Equity	19.4%	20.6%	-1.2%
Global Natural Resources Equity	23.3%	23.5%	-0.2%
Gold	16.4%	16.3%	+0.1%
Real Estate - Core	15.0%	15.0%	-
Real Estate – Value-Add	23.4%	20.4%	+3.0%
Real Estate - Opportunistic	25.8%	23.3%	+2.5%
Private Debt - Real Estate	11.9%	11.9%	-
Private Real Assets - Natural Resources	32.3%	32.5%	-0.2%
Private Real Assets - Infrastructure	12.4%	12.4%	-

INFORMATION DISCLAIMER

Past performance is no guarantee of future results.

The goal of this report is to provide a basis for substantiating asset allocation recommendations. The opinions presented herein represent the good faith views of NEPC as of the date of this report and are subject to change at any time.

Information on market indices was provided by sources external to NEPC. While NEPC has exercised reasonable professional care in preparing this report, we cannot guarantee the accuracy of all source information contained within.

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- **NEPC's private markets pacing analysis projects a potential level of future assets and cash flows for a single scenario based on a series of assumptions. This analysis is intended to help estimate future exposure levels. It is not a guarantee of future cash flows, appreciation or returns.**

- **The timing and amounts of projected future cash flows and market values of investments could vary significantly from the amounts projected in this pacing analysis due to manager-specific and industry-wide macroeconomic factors.**

- **Estimates of projected cash flows and market values for existing private markets commitments were made at the Fund level and do not incorporate any underlying portfolio company projections or analysis.**

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ALTERNATIVE INVESTMENT DISCLOSURES

It is important that investors understand the following characteristics of non-traditional investment strategies including hedge funds and private equity:

1. **Performance can be volatile and investors could lose all or a substantial portion of their investment**
2. **Leverage and other speculative practices may increase the risk of loss**
3. **Past performance may be revised due to the revaluation of investments**
4. **These investments can be illiquid, and investors may be subject to lock-ups or lengthy redemption terms**
5. **A secondary market may not be available for all funds, and any sales that occur may take place at a discount to value**
6. **These funds are not subject to the same regulatory requirements as registered investment vehicles**
7. **Managers may not be required to provide periodic pricing or valuation information to investors**
8. **These funds may have complex tax structures and delays in distributing important tax information**
9. **These funds often charge high fees**
10. **Investment agreements often give the manager authority to trade in securities, markets or currencies that are not within the manager's realm of expertise or contemplated investment strategy**

Christopher Ailman has over four decades of institutional asset owner experience. He served as a public pension Chief investment Officer from 1986 to 2024, the last 23 years with the $340 billion California State Teachers' Pension Plan ("CalSTRS"). He managed billion-dollar portfolios through numerous bear markets and the global financial crisis of 2008. As the CIO, he has lead investment teams from three to 245 professionals. In 2024, he founded his own firm Ailman Advisers to provide mentoring, career guidance, and public speaking. He is passionate about the need for investors to think and act long-term to achieve sustainable results.

Ailman is the chair of the 300 Club; Chair Emeritas of the Milken Global Capital Markets Committee; and a Member of the CFA DEI Steering Committee. He has served on corporate and advisory boards in the United States and the United Kingdom. He has represented institutional investors on the MSCI Index Editorial Advisory Board, and the Toigo Foundation Advisory Board. In 2016, he was part of the first cohort to achieve a Fundamentals of Sustainable Accounting credential.

Recognized as one of the top CIOs globally, he has received numerous awards and recognitions, including the Institute for Fiduciary Education's CIO of the Year in 2000, the Richard Stoddard Award for service in the investment of public pensions in 2003, the Distinguished Service Award for Advancement of Latinos in Business from the New American Alliance in 2006, and Institutional Investor magazine's Large Public Fund Manager of the Year Award in 2011. In 2017, he received Institutional Investor magazine's first Lifetime Achievement Award and was named the top CIO in the world by Chief Investment Officer magazine in 2013, 2017, and 2018. In December 2023, he received the CIO Magazine Lifetime Achievement Award. In July 2024, he was inducted into the CIO Hall of Fame by the Markets Group.

Ailman has a Bachelor of Arts in business economics from the University of California, Santa Barbara. He received his certified financial planner designation from the University of Southern California. He is married with three daughters and two grandsons.